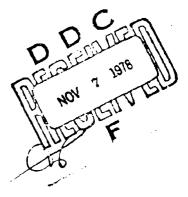


The Diagnostic Rhyme Test (DRT): An Air Force Implementation

STEVEN MEISTER, Capt, USAF

RADC-TR-78-129



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BEFORE COMPLETING FORM & GOVT ALCHISTON NO RADC -TR -78 - 129 TYPE OF REPORT & PERIOD COVERED THE DIAGNOSTIC BHYME TEST (DRT): AN AIR FORCE IMPLEMENTATION, In-house Report PERFORMING ORG PEPONT NUMBER CONTRACT OR GRANT NUMBERIAL Steven/Meister Capt, USAF PERFORMING ORGANIZATION NAME AND ADDRESS PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS Deputy for Electronic Technology (RADC/ETC) Hanscom AFB Massachusetts 01731 78200201 CONTROL LING OFFI. I NAME AND ADDRESS Deputy for Electronic Technology (RADC/ETC) May 78 Hanscom AFB Massachusetts 01731 207 MONITORING ACENCY NAME & ADDRESS(If different from Controlling Office) Unclassified SA DECLASSIFICATION DAG 'S DISTRIBUTION STATEMENT (of this Report) Approved for public release; distribution unlimited. "7 SIGT SIRUTION STATEMENT (of the abstract entered in Block 20. If different from Reports TO SUPPLEMENT ARY NOTES 19 KEY WORDS (Continue on reverse side if necessary and identify by block number) Voice communication Speech intelligibility Test and evaluation Diagnostic rhyme test DRT 20 ABSTRACT (Continue on reverse side if necessary and identify by block comber) The Diagnostic Rhyme Test (DRT) for intelligibility of voice communications systems has been implemented at the Air Force Voice Processing Facility, Hansoom AFB, Massachusetts. This report describes the recruiting and training of listeners and the usage of software to score the DRT. In addition, performance of the in-house DRT is described. It is concluded that the in-house DRT is an economical measure of intelligibility that yields highly reliable results and adequately discriminates small differences in intelligibility. It is further concluded that in-house DRT results are comparable DD . TAN 79 1473 EDITING OF THOU AT IS OBSOLETE

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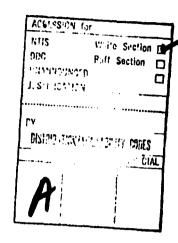
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The Diagnostic Rhyme Test (DRT): An Air Force Implementation

1. INTRODUCTION

The Diagnostic Rhyme Test (DRT)¹ for intelligibility was initially developed under Contract No. F19628-70-C-0182 for the Air Force Electronic Systems Division, Voice Processing Laboratory (formally part of the Air Force Cambridge Research Laboratories, Data Sciences Laboratory). In recent years the DRT has emerged as a DoD Standard for testing the intelligibility of voice communications terminals. This is evidenced by its extensive use by the DoD Narrowband Secure Voice Consortium during its FY75 and FY76 Test and Evaluation of candidate narrowband digital voice algorithms for use in the 1980's. The DRT's used by the Consortium were evaluated under contract by Dynastat, Inc., Austin, Texas, the developers of the test. This report documents the development of an in-house capability to administer and score the DRT.

⁽Received for publication 16 June 1978)

Voiers, W. D., Sharpley, A. D., and Hehmsoth, C.J. (1973) Research on Diagnostic Evaluation of Speech Intelligibility, AFCR1.-72-0894.

2. THE DIAGNOSTIC RHYME TEST

2.1 Introduction

The DRT is a test for intelligibility rather than user acceptance, or quality, of voice systems. Although related, it is important to note the distinction between intelligibility and quality. It is possible for a voice system to be perfectly intelligible yet have a very unnatural sound or not permit speaker recognition. In such a case the system is likely not to be acceptable to the user. On the other hand, a system having poor intelligibility will certainly be unacceptable to the user. Thus, a prerequisite for user acceptance is high intelligibility. The DRT is a measure of that characteristic of a voice system. The test is structured in such a way as to allow a detailed analysis of the ability of a system to reproduce certain classes of phonemes. These classes are categorized by the binary attributes VOICING, NASALITY, SUSTENTION, SIBILATION, GRAVENESS, and COMPACTNESS. The test provides a means of measuring the performance of the voice system for each state, present or absent, of these six attributes as well as total intelligibility. Using these results, specific weaknesses in the voice system can be pinpointed and corrected. This method of diagnostic analysis has been successfully used. 2, 3

2.2 Usage

A series of master tape recordings have been prepared by Dynastat, Inc. under various Government contracts to be used as input speech material for testing the intelligibility of the voice system under consideration. Each tape recording consists of one or more speakers uttering a known randomized sequence of words. Each word has been selected from a pair of rhyming words differing only in the leading consonant. Figure 1 presents the sequence of events for DRT usage. In order to conduct a DRT one or more master tape recordings are used as input speech material to the voice system under test. The processed output speech is tape recorded for later presentation to a crew of listeners for evaluation. The listeners' task is to determine which of the rhyming words had been uttered by the speaker. After all tape recordings processed by the system under test have been heard by the listening crew, computer analysis of the listeners' responses takes place and a comprehensive printout of the results is provided. Further analysis by the user can then take place.

Smith, C. P. (1976) Comparative Evaluations of Speech Intelligibility Performance of Three Narrowband Voice Communications Methods: Trivoc, Linear Prediction Coding (LPC) and Piecewise Linear Prediction Coding (PLPC) ESD-TR-77-131.

^{3.} Smith, C. P. (1977) Intelligibility Performance of Narrowband Linear Predictive Vocoders in the Presence of Bit Errors, ESD-TR-77-328.

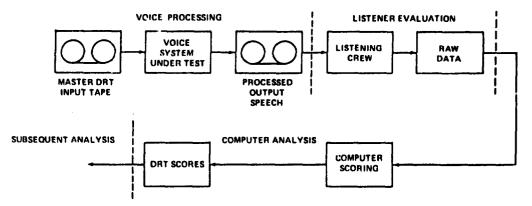


Figure 1. DRT Usage. The sequence of events

2.3 Structure of the DRT

A complete DRT consists of one sneaker uttering 464 words of which 384 words are actually scored. The remainder are filler and experimental words. DRT's are normally administered in half tests (192 words) using multiple speakers. The complete list of words used in the DRT appear in Figures 2a through 2d. The DoD Narrowband Secure Voice Consortium has prepared a set of DRT master input tapes using various microphones and ambient acoustic noise backgrounds. These tapes are in the possession of this office and are available for DRT testing. Table 1 is a summary of these tapes. In addition, master DRT tapes as indicated in Tables 3, 4, and 5 are also available.

2,3,1 THE TEST BOOKLET

Each listener who is tasked to evaluate a processed tape recording has before him a four page test booklet for each speaker he will hear. The booklet is sufficient to score one half test. The booklet is shown in Figures 2a through 2d. The speech material the listener hears consists of 232 words uttered by each speaker. The words are one word from each of the word pairs in the test booklet. The listener is instructed to strike out the word he thinks he hears. The booklet is structured so that the word pairs on Figures 2a and 2c are the same but presented in the reverse order. Similarly, the word pairs on Figures 2b and 2d are the same but appear in reverse order. In addition, the present state of each of the six attributes are represented by the left word in each column on Figures 2a and 2b while the absent state is represented by the right word in each column on those pages. The reverse is true for Figures 2c and 2d.

Table 1. Available Master DRT Tapes

Tape	DRT TAPES	*Environ-	_		*Mic	roph	OD A	7
10	Speaker / List	ment	1	2	3	4	5	6
E-1-A	LI, 302A, CH 308B, RH 310A	Quiet	X	×	х	х	Г	
E-1-8	JE 306A, BV 303A, PK 309A	"	x	х	х	х		
E-2-A	LI, 302B, CH 307A, RH 310B	**	x	x	х	х	l	
E-2-B	JE 306B, BV 303B, PK 312B	,,	x	x	х	x		
E-3-A	LT. 301A, CH 308A, RH 311A	**	x	x	х	x		
E-3-B	JE 305A, BV 304A, PK 312A	**	х	x	х	x		
E-4-A	LL 301B, CH 307B, R€ 311B	**	х	х	х	х		
E-4-B	JE 305B, BV 304B, PK 309B	,,	х	х	х	х		
E-5-A	JS 317A, LS 315A, MP 314A	"	x	x I	x	x		
E-5-B	JS 317B, LS 315B, MP 314B	"	х	х	x	x		
E-6-A	JS 318A, LS 316A, MP 313A	"	x	×	x	х		
E-6-B	JS 318B, LS 316B, MP 313B	"	x	х	х	x		
G-1-A	RH 318A, JE 310A, CH 314A	APCP	x		х		х	
G-1-B	RH 318B, JE 310B, CH 314B	"	х		x		х	
G-2-A	RII 317A, JE 309A, CH 313B	HEL	x		X		i	x
G-2-B	RH 317B, TE 309B, CH 313A	"	х		x			х
G-3-A	RH 303A, JE 311A, CH 315A	SHIP	x		x		х	
G-3-B	RH 303B, JE 311B, CH 315B	"	x	Ì	х		x	
G-4-A	RH 304A, JE 312A, CH 316A, JS 305A	Office	x		x		х	
G-4-B	RH 304B, JE 312B, CH 316B, JS 305B	11	x		x		x	

*Environment: Ambient Acoustic Noise Simulated in a Sound Room.

ABCP - Airborne Command Post

HEL - Helicopter

SHIF - Shipboard

** See Table 2 for microphone identification.

Table 2 Microphone Identification Used in Table 1,

- 1 Altec 659A Dynamic Microphone
- 2 Western Electric T1 Carbon Microphone
- 3 Grason-Stadler E7300M Throat Microphone
- 4 General Radio 1560-P5 Ceramic Studio Microphone
- 5 Roanwell Dynamic Noise Cancelling Microphone
- 6 Electrovoice M-78/AIC Dynamic Helicopter Microphone

Table 3 Available Word List: and Speakers (100 Series)

Word List	Speaker	Word List	Speaker
102A	BV	108A	СН
102B	BV	108B	СН
103 A	вv	111A	JE
103B	BV	111B	JE
104 A	RD	112A	SN
10413	RD	112B	SN
105A	RD	113A	JE
105B	RD	113B	JE
106A	BL	115A	SN
10613	Bt.	115B	SN
107 A	СН	116A	BL
10713	CH	116B	BL

Table 4. E-4a Advanced Airborne Command Post Master DRT Tapes

Tape	DRT Tapes			+ M1	crop	hone	
ďì	Speaker/List	Environment	1	2	3	4	5
S-1-A	SM 301A, SK 307A. BD 311A	Quiet	X	х	Х	X	
S-1-B	HH 303A, MM 305A, IP 309A	Quiet	X	X	X	X	
S-2-A	SM 301B, SK 307B, BD 311B	Quiet	X	x	x	X	
S-2-B	НН 303В, ММ 305В, IP 309В	Quiet	X	X	x	X	
T-1-A	SM 302A, SK 308A, BD 312A	E-4A Noise	X	X	\mathbf{x}		X
т-1-В	HH 304A, MM 30GA, IP 310A	E-4A Noise	X	X	X		X
T-2-A	SM 302B, SK 308B, BD 312B	E-4A Noise	X	X	X		X
T-2-B	нн зо4в мм зо6в, гр з 10в	E-4A Noise	X	X	X		X

*Microphones:

- 1 ALTEC 659A Dynamic Microphone
- 2 Roanwell Confidencer Microphone P/N 240100001
- 3 Grason-Stadler E7300M Throat Microphone
- 4 General Radio 1560-P5 Ceramic Studio Microphone
- 5 Noise only General Radio 1560-P5

Table 5. E-3A AWACS Master DRT Tapes

Tape	DRT Tapes					phon	_
ID	Speaker/List	Environment	1_	2		4	. 5
S-3-A	CH 301A, JE 305A, SM 309A	Quiet	X	x	X	X	
S-3-B	IP 303B, MC 307A, GM 311A	Quiet	X	X	X	X	
S-4-A	CH 301B, JE 305B, SM 309B	Quiet	::	X	X	X	
S-4-B	IP 303A, MC 307B, GM 311B	Quiet	X	X	X	X	
T-3-A	CH 302A, JE 306A, SM 310A	E-3A Noise	X	X	X		X
T-3-B	IP 304A, MC 308A, GM 312B	E-3A Noise	N	X	N		X
T-4-A	CH 302B, JE 306B, SM 310B	E-3A Noise	X	X	X		X
T-4-B	IP 304B, MC 308B, GM 312A	E-3A Noise	X	X	X		X

*Microphones:

- 1 ALTEC 659A Dynamic Microphone
- 2 H-335/A1C Headset Microphone
- 3 Grason-Stadler E7300M Throat Microphone
- 4 General Radio 1560-P5 Ceramic Studio Microphone
- 5 Noise only General Radio 1560-P5

ROW		
1	GOB - BOB	COOT - TOOT
2	DAUNT - TAUNT	BOND - POND
3	MOOT - BOOT	MOAN - BONE
4	SHEET - CHEAT	VILL - BILL
5	JAB - GAB	JEST — GUEST
6	POT - TOT	FOUGHT - THOUGHT
7	GHOST - BOAST	COOP - POOP
8	LIP - RIP	LEAP - REAP
9	ZED - SAID	VAST - FAST
10	GNAW - DAW	KNOCK - DOCK
11	SHOES - CHOOSE	THOSE - DOZE
12	CHEEP - KEEP	SING _ THING
13	BANK - DANK	MET - NET
14	GOT - DOT	CAUGHT - TAUGHT
15+	LOAD - ROAD	LEWD - RUDE
16	DINT - TINT	BEAN - PEEN
17	NECK - DECK	MAD - BAD
18	THONG — TONG	VOX - BOX
19	CH00 - C00	JOE - GO
2ა	WEED - REED	BID - DID
21	SHAG - SAG	YEN - WEIN
22	LOT - ROT	LAW - RAW
23	VOLE - FOAL	Z00 - SUE
24	NIP - DIP	NEED - DEED
25	FENCE - PENCE	THAN - DAN
26	SAW — THAW	CHOP - COP
27	POOL - TOOL	FORE - THOR
28	YIELD - WIELD	HIT - FIT
29	LAP - RAP	LEST - REST

Name

Figure 2a. DRT Test Booklet

YOU - RUE

JILT - GILT

VEAL - FEEL

```
PEST - TEST
                                               FAN - PAN
        YAULT - FAULT
                                              JOCK - CHOCK
3
         NEWS - DUES
                                              NOTE - DOTE
4
         VEE - BEE
                                              THICK - TICK
5
         SANK - THANK
                                              CHAIR - CARE
6
         WAD - ROD
                                              BONG - DONG
7
        SHOW - SO
```

ROW

8

9

10

11

12

16

Name

And the state of t

LID - RID LEEK - REEK DENSE - TENSE GAFF - CALF MOSS - BOSS MOM - BOMB FOO - POOH THOUGH - DOUGH ZEE - THEE

13 FAD - THAD PENT - TENT 14 HOP - FOP YAWL - WALL 15+ LOW - ROW LOOT - ROOT

GIN - CHIN

17 MEND - BEND NAB - DAB SHAW - CHAW 18 VON - BON 19 JUICE - GOOSE SOLE - THOLE

PEEK - TEAK 20 FIN - THIN 21 GAT - BAT KEG - PEG LOCK - ROCK 22 LONG - WRONG

23 GOAT - COAT DUNE - TUNE 24 MIT - BIT MEET - BEET

25 THEN - DEN SHAD - CHAD

26 JAWS - GAUZE JOT - GOT 27 MOON - NOON BOWL - DOLE

28 KEY - TEA GILL - DILL 29

LAMP - RAMP LEND - REND

Figure 2b. DRT Test Booklet

ROW

1	BOB - GOB	TOOT - COOT
2	TAUNT - DAUNT	POND - BOND
3	BOOT - MOOT	BONE - MOAN
4	CHEAT - SHEET	BILL - VILL
5	GAB - JAB	GUEST - JEST
6	TOT - POT	THOUGHT- FOUGHT
, 7	BOAST - GHOST	POOP - COOP
8	RIP - LIP	REAP - LEAP
9	SAID - ZED	FAST - VAST
10	DAW - GNAW	DOCK - KNOCK
11	CHOOSE - SHOES	DOZE - THOSE
12	KEEP - CHEEP	THING - SING
13	DANK - BANK	NET - MET
14	DOT - GOT	TAUGHT - CAUGHT
15+	ROAD - LOAD	RUDE - 1.EWO
16	TINT - DINT	PEEN - BEAN
17	DECK - NECK	BAD - MAD
18	TONG - THONG	BOX - VOX
19	COO - CHOO	GO - JOE
20	REED - WEED	010 - 810
21	SAG — SHAG	WREN - YEN
22	ROT - LOT	RAW - LAW
23	FOAL - VOLE	SUE - 200
24	DIP - NIP	DEED - NEED
25	PENCE - FENCE	DAN - THAN
26	THAW - SAW	COP - CHOP
27	TOOL - POOL	THOR - FORE
28	WIELD - YIELD	F!T = HIT
29	RAP - LAP	REST - LEST

Figure 2c. DRT Test Booklet

ROW		
1	TEST - PEST	PAN - FAN
2	FAULT - VAULT	CHOCK - JOCK
3	DUES - NEWS	DOTE - NOTE
4	BEE - VEE	TICK - THICK
5	THANK - SANK	CARE - CHAIR
6	ROD - WAD	DONG - BONG
7	SO - SHOW	RUE — YOU
8	RID — LID	REEK — LEEK
9	TENSE - DENSE	CALF — GAFF
10	BOSS - MOSS	BOMB - MOM
11	POOH - FOO	COUGH - THOUGH
12	THEE - ZEE	GILT - JILT
13	THAD - FAD	TENT - PENT
14	FOP - HOP	WALL - YAWL
15,	ROW - LOW	ROOT - LOOT
16	CHIN — GIN	FEEL - VEAL
17	BEND - MEND	DAB - NAB
18	CHAW - SHAW	BON - VON
19	GOOSE - JUICE	THOLE - SOLE
20	TEAK - PEEK	THIN - FIN
21	BAT — GAT	PEG — KEG
22	ROCK - LOCK	WRONG - LONG
23	COAT - GOAT	TUNE - DUNE
24	BIT - MIT	BEET - MEET
25	DEN - THEN	CHAD - SHAD
26	GAUZE - JAWS	GOT - JOT
2 7	NOON - MOON	DOLE - BOWL
2 8	TEA - KEY	DILL — GILL
29	RAMP - LAMP	REND — LEND

Figure 2d. DRT Test Booklet

2.3.2 THE MAJOR ATTRIBUTES

The six attributes tested by the DRT are VOICING, NASALITY, SUSTENTION, SIBILATION, GRAVENESS, and COMPACTNESS. Each of the 192 word pairs in a half-test has been selected so that the leading consonant differs only in the present or absent state of a single attribute. The particular attribute tested by each word pair is shown in Figure 3. The 1st, 8th, 15th, 22nd and last words in each column are not scored. These words are included to allow time for turning pages, moving to the top of the next column, and for inclusion of experimental words. A couple of examples will serve to clarify this.

Example 1. In Figure 2a, the 11th word pair in the left hand column is SHOES-CHOOSE. In Figure 3, the attribute corresponding to the 11th word pair is SUSTENTION. Thus, the word pair SHOES-CHOOSE tests the attribute SUSTENTION. Further, since this word pair is shown on the first page of the booklet, the leading consonant in SHOES exhibits the present state of the attribute while the leading consonant of the word CHOOSE exhibits the absent state of the attribute, thus, SHOES represents a SUSTAINED consonant while CHOOSE represents an ABRUPT consonant.

Example 2. In Figure 2d, the third word pair in the right column is DOTE-NOTE. From Figure 3, it can be seen that this word pair tests the attribute NASALITY. Since this word pair is shown on the fourth page of the booklet, we observe that DOTE represents the absent state of NASALITY (Non-Nasal) while NOTE represents the present state of NASALITY (Nasal).

2.3.3 THE SUB-FEATURES

The following constraints were observed in constructing the set of test words:

- (a) Half of the items designed to test VOICING are fricatives; the other half are stop consonants,
 - (b) Half of the NASALITY phoneme pairs are grave; the rest acute,
 - (c) Half of the SUSTENTION items are voiced; half unvoiced,
- (d) Half of the phoneme pairs that test SIBILATION are voiced, the remainder unvoiced,
 - (e) Half of the GRAVENESS test items are voiced; the other half unvoiced,
 - (f) Half of the COMPACTNESS items are voiced; the remainder unvoiced.

Row		
1	Filler	Filler
2	Voicing	Voicing
3	Nasality	Nasality
4	Sustention	Sustention
5	Sibilation	Sibilation
6	Graveness	Graveness
7	Compactness	Compactness
8	Experimental	Experimental
9	Voicing	Voicing
10	Nasality	Nasality
11	Sustention	Sustention
12	Sibilation	Sibilation
13	Graveness	Graveness
14	Compactness	Compactness
15	Experimental	Experimental
16	Voicing	Voicing
17	Nasality	Nasality
18	Sustention	Sustention
19	Sibilation	Sibilation
20	Graveness	Graveness
21	Compactness	Compactness
22	Experimental	Experimental
23	Voicing	Voicing
24	Nasality	Nasality
25	Sustention	Sustention
26	Sibilation	Sibilation
27	Graveness	Graveness
28	Compactness	Compactness
29	Experimental	Experimental

Figure 3. Attribute Tested-Word Pair Position

Figure 4 can be used in conjunction with Figures 2a-d and 3 to determine exactly which word pairs are presented with the sub-features indicated above. A plus (+) in Figure 4, indicates that the two words exhibit the present state of the sub-feature; a minus (-) the absent state. The sub-feature assignments are the same for pages 1 and 3 of the DRT test booklet as well as for pages 2 and 4. The columns of pluses and minuses in Figure 4, correspond to the columns of word pairs in the DRT test booklet. Notice that in Figure 3 each major attribute is tested four times in each column. Thus, there are four pluses and minuses in each column for each major attribute in Figure 4. The following examples will serve to illustrate the use of Figures 2a-d, 3, and 4 to determine the major attribute and sub-feature of each word pair.

Page No.	VOICING	NASALITY	SUSTENTION	SIBILATION	GRAVENESS	COMPACTNESS
		+ +	- +	+ +	• •	+ -
	+ +		- +		+ +	+ -
1&3		- +	- +	- +	+ +	- +
	+ +		• +			+ -
	+ +		+ -		+ +	- +
		+ +	- +	+ +		+ +
264	+ +	+ -	- ,+-	+ -		+ -
		+ +	+ -	+ +	+ +	- +
		<u>Main At</u>	tribute Su	b-Feature (+/	<u>-)</u>	
		Voicing Nasalit		ictional/Non- ave/Acute	Frictional	
1		Sustent	•	iced/Unvoiced		
1		Sibilat	ion Vo	iced/Unvoiced		
ĺ		Gravene	ss Vo	iced/Unvoiced		
]		Compact	ness Vo	iced/Unvoiced		

Figure 4. Sub-Feature State Location in Test Booklet

Example 1. The second word pair shown on page 1 of the DRT test booklet (Figure 2a) in the left column is DAUNT-TAUNT. Figure 3 indicates that this word pair tests the attribute VOICING. Since this word pair is shown on page 1, (Figure 2a) we conclude that DAUNT represents the voiced case and TAUNT represents the unvoiced case. Referring to Figure 4, we observe that the first pair of words in the left hand column of page 1 of the DRT test booklet that tests the attribute VOICING exhibit the absent (-) state of the sub-feature. That is, the words DAUNT and TAUNT are non-frictional. The word pair ZED-SAID shown on page 1 (Figure 2a) also tests the VOICING attribute. However, these words are frictional.

This can be observed by noting that they are the second word pair in the left column shown on page 1 (Figure 2a) that tests the attribute VOICING. Figure 4 indicates that these two words are frictional (+).

Example 2. The 17th word pair shown on page 4 of the DRT test booklet (Figure 2d) in the right column is DAB-NAB. From Figure 3, we ascertain that this word pair tests the attribute NASALITY. Further, since this word pair is shown in page 4 (Figure 2d), we conclude that DAB is non-nasal and NAB is nasal. The sub-feature for NASALITY is graveness. Referring to Figure 4 we see that the third word pair in the right column shown on page 4 (Figure 2d) that tests the attribute NASALITY exhibits the absent (-) state of the sub-feature graveness. Thus the leading consonant of the word DAB is non-nasal and acute while the leading consonant of the word NAB is nasal and acute. In contrast, the 17th word pair in the left column shown on page 4 (Figure 2d) is BEND-MEND. This pair also tests NASALITY. Figure 4 indicates that these words are grave (+).

2.3.4 THE WORD LISTS

The words in Figures 2a-d have been spoken by each speaker in a predetermined sequence called a word list. Each word list is identified by a three digit number followed by the letter A or B. The letter Λ is used to identify the first half of the DRT and B to identify the second half. Tables 1, 3, 4, and 5 contain summaries of word lists available and the associated speaker's initials. Appendix Λ contains the actual word lists.

3. EARLY IN-HOUSE DEVELOPMENT

3.1 Rationale

La tell Line of Nova States

The DRT has proven itself to be a useful diagnostic tool for finding weaknesses in narrowband digital voice processing algorithms. However, the cost of a DRT using contractor resources was considered too high (approximately \$550,00 for a six speaker DRT in FY 78) to make it practical for testing the many algorithm changes required on a week to week basis. In addition, the cost was too high to repeat the test for each configuration in order to obtain estimates of measurement errors needed for a complete statistical analysis (that is, Analysis of Variance⁴). It was determined that DRTs could be conducted at the Air Force Voice Processing Facility, Hanscom Air Force Base using existing hardware for approximately one-tenth the contractor cost, excluding the scoring software development costs. Inhouse resources were to be used to develop the software.

Guenther, W.C. (1964) <u>Analysis of Variance</u>, Prentice-Hall, Inc., Englewood Cliffs, N.J.

3.2 Scoring Software - CSP-30 Implementation

The DRT scoring software was written in FORTRAN IV and implemented on the CSP-30 High Speed Signal Processor. Figure 5 shows flow charts of the scoring programs as implemented on the CSP-30. The program listing and a sample printout of the test results for a two-speaker, two-listener DRT are contained in Appendix B.

3, 2, 1 PROGRAM USAGE

The scoring software as implemented on the CSP-30 requires manual data entry via the ADDS Video Terminal. The program is used as follows:

- a. Load the 32K FORTRAN MIOCS.
- b. Load the DRT Scoring Program (Cartridge Output).
- c. Run at starting address = 0.
- d. Be sure line printer is on-line.
- e. The ADDS terminal will display:
 INSERT 150 FT CARTRIDGE IN UPPER DECK
 I/O RESET CONTINUE.

Be sure the cartridge is write enabled. Insert it into the upper Tri-Data deck.

Input up to 50 ASCII characters to identify the system under test, date, etc.

g. ADDS will display: HOW MANY LISTENERS?

Input an integer from 1 to 12 in 12 format.

h. ADDS will display: HOW MANY SPEAKERS?

Input an integer from 1 to 6 in I2 format.

Input up to 24 ASCII characters to identify the listener.

The following steps j through r will occur for each listener I and each speaker J:

J. ADDS will display:

FOR LISTENER I SPEAKER J ENTER KEY NUMBER AND LETTER NNNL

Enter the word list number in I3 format followed by the suffix letter in ASCII,

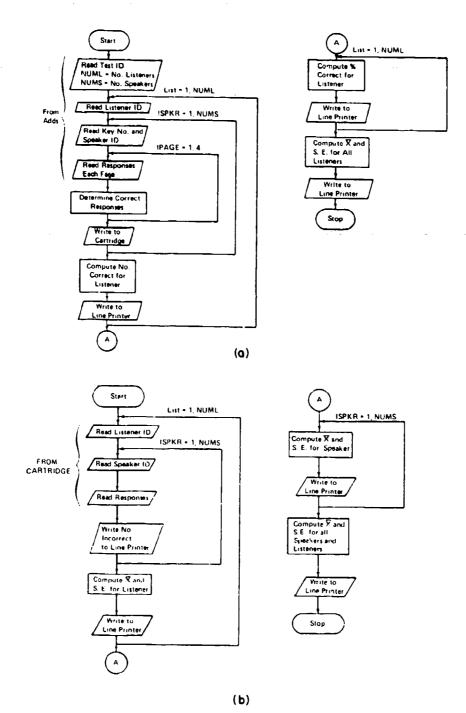


Figure 5. DRT Scoring

k. If no such key is in the program the ADDS will display:

******NO KEY XXXA*****

where XXXA is the key entered: The program will go to step j above. If the key is a valid one in the 100 series, the ADDS will display:

KEY = XXXA SPEAKER

IF OK ENTER Ø

where XXXA is the key entered and SPEAKER is the speaker identification associated with that key as stored in the program. However, if the key entered is a 300 series key, the ADDS will display:

SPEAKER?

92

Enter two (2) ASCII characters identifying the speaker. ADDS will then display:

KEY = XXXA SPEAKER

IF OK ENTER Ø

If anything other than 0 is entered the program returns to step j above. Steps 1 through p below occur for each page, K= 1, 2, 3, 4 of the answer booklet (see Figures 2a through 2d).

l. ADDS will display:

FOR KEY XXXA LISTENER I PAGE K ENTER RESPONSE BY COLUMNS 1 = FIRST WORD 2 = SECOND WORD

REFERENCE REFEREN

For the first column of each word pair on page K of listener I's answer book enter a 1 if the first word of the pair was selected or a 2 if the second word was selected. After the first column has been entered hit new line. Enter the second column in the same way.

m. ADDS will display a graphic representation of the first 15 rows of the page just entered. An example is:

1 2	XXXXX	XXXXX	3737373737
	XXXXX		XXXXX
3	XXXXX		XXXXX
4 5	XXXXX	XXXXX	
	XXXXX	XXXXX	
6	XXXXXXXXXXXXX		XXXXX
7	XXXXX		XXXXX
8,	XXXXX	XXXXX	
9	XXXXX	XXXXX	
10	XXXXX	XXXXX	
11	XXXXX		XXXXX
12	XXXXXXXXXXXXX		XXXXX
13	XXXXX		XXXXX
14	XXXXX	XXXXX	
15	XXXXX		XXXXX
T	OK ENTER 6		

This allows you to check for errors in key punching the entries of the first 15 rows. Notice that rows 6 and 12 in column 1 contain X's in both first and second word

positions. This indicates that something other than 1 or 2 was entered in those positions and corrections should be made.

n. If no corrections are needed enter Ø followed by new line. Anything other than Ø implies a correction is to be made. ADDS will display:

ROW AND COLUMN TO CHANGE? ENTER 999 TO CHANGE ENTIRE PAGE RRC

Enter the row number in 12 format followed by the column number in II.

o. If 999 was entered program will go to step 1 above. If a row outside the range 1 to 29, other than 99, or a column other than 1 or 2 is entered, program goes to step a above. If row and column are within the specified range, ADDS displays:

NEW ENTRY?

R

Enter a 1 or 2. Program goes to step m above.

p. After corrections to rows 1 through 15 are made, rows 16 through 29 are displayed and corrected in a similar manner. (NOTE: Corrections to any row can be made regardless of the rows being displayed.)

q. After all pages for listener I, key XXXA have been scored, the next speaker is scored in the same way. After all speakers for listener I have been scored the data is output to the cartridge and a printout of listener I's correct responses is made.

r. The next listener is scored in the same way.

s. After all listeners have been scored, a percent correct printout is made for each listener using the transformation

SCORE =
$$\frac{R-W}{T}$$
 X (100)

Where R = Number correct

W Number incorrect

To - Total number of items

t. A summary of all scores and standard errors across listeners is then printed (see Appendix B). Program stops.

u. Load the DRT Scoring Program (Cartridge Japut).

v. Run at starting address = 0.

w. ADDS will display:

INSERT CARTRIDGE IN UPPER DECK

I/O RESET-CONTINUE

Insert the cartridge containing the DRT data into the upper Tri-Data deck. After hitting I/O Reset and Continue, the program will execute as in Figure 5b. A comprehensive printout of DRT results will be made as shown in Appendix B. No further interaction with the ADDS terminal is required.

3.3 Listeners

It was considered crucial to the success of the in-house DRT program that sufficient numbers of listeners be recruited and that their performance on the DRT be consistent. The reliability of the DRT as a useful tool in measuring intelligibility so that meaningful comparisons between voice systems can be made is dependent on the repeatability of the scores. That is, if a particular DRT is administered to a crew of listeners at different points in time, are the results different? If they are, the credibility of the test is in question. It has been shown that the DRT is highly reliable in this regard if a properly selected and trained listening crew is used. ⁵

In addition, for the in-house DRT program to be of maximum utility, the results obtained should be comparable to those obtained by others who administer the same test to their listeners. In particular, we felt it essential that in-house DRT results be comparable to those obtained by Dynastat. Inc.

During the period February-October 1976, 21 volunteer listeners participated in DRT tests to determine the feasibility of implementing an in-house DRT program. The volunteers were recruited from the Hanscom AFB community. They consisted of U.S. Air Force military, civilian employees, military dependents and in-house contractor personnel. Each listener was subjected to a pure tone audiometric test for hearing loss and passed the requirements for an H-1 profile as specified in AFM 160-1 (C9) Attachment 3, 2 May 1975. During the period February-March 1976 four listening sessions were conducted. Each session was approximately two hours in duration. From four to seven listeners participated in each session. The purpose of this initial trial period was to gain some insight into the feasability of conducting in-house DRTs and to determine if comparability with contractor results can be obtained. A second trial period consisting of three sessions was conducted in October 1976. The purpose of this trial period was to measure the repeatability of scores for in-house DRTs and to detect any significant learning trends when a listener is repeatedly exposed to the same test. Seven listeners were used during this second trial period. All but two had been used in the previous tests.

3.3.1 COMPARABILITY

Tables 6a to 6c contain summaries of the results of in house listening Sessions 2,3, and 4 conducted during February and March 1976 as well as Dynastat scores for the same PRT tapes. The systems used in the tests were all vocoders at various narrowband data rates. Only those scores for listeners who participated in two or more sessions are reported. Session 1 is not included because it served as an orientation for the listeners. The tables also include 95 percent confidence intervals

^{5.} Voiers; W. D. (1965) Performance Evaluation of Speech Processing Devices II.

The Role of Individual Differences, AFCRI,-66-24.

based on the Dynastat means and standard errors. In addition, the differences between in-house and Dynastat means are included. Those in-house mean scores that lie outside the confidence interval are marked with an asterisk (*). Some observations follow:

- a. No attempt was made to screen and eliminate listeners for the purpose of improving in-house means.
- b. Of the listeners used in this trial period only two participated in three sessions. All others participated in two or fewer sessions.
- c. The general tendency for in-house scores was to approach Dynastat scores as listeners gained experience. In the second listening session seven in-house means fell below their confidence intervals while six fell below their confidence intervals for Sessions 3 and 4. The median difference between in-house and Dynastat means improved from -3.2 to -2.05 from Session 2 to Session 3. For Session 4 the median difference was -2.3.

Table 6a. In-House and Dynastat DRT Scores. Listening Session 2 - 25 Feb 1976

				IN-HO	USE						
				LISTE	NER						
System	Speaker	14	Şb	41	53	(A	MEAN	MEAN	S.E.	95° C.I.	DIFF
1102	BL	87.5	87.5	86.5	76.C	89.6	84.4*	89.6	1.35	(86.4, 92.8)	-5.2
	СН	86.5	89.6	88.5	84.4	87.5	87.3	89.8	1.19	(87.0, 92.6)	-2.5
	SN	82.3	72.9	82.3	76.0	78.1	78.3*	83.5	1.27	(80.5, 86.5)	-5.2
1103	BL	89.6	82.3	88.5	85.4	87.5	86.7	86.6	1.74	(82.5, 90.7)	+0.1
	СН	91.7	85.4	85.4	87.5	90.6	88.1*	91.7	0.88	(89.6, 93.8)	-3.6
	SN	75.0	74.0	78.1	80.2	75.0	76.5*	79.7	1.04	(77.2, 82.2)	-3.2
1104	BL	85.4	82.3	86.5	85.4	85.4	85.0*	88.3	1.19	(85.5, 91.1)	-3.3
	СН	23.8	85.4	88.5	85.4	87.5	88.1	90.8	1.16	(83.1, 93.5)	-2.7
	SN	83.3	82.3	81.3	80.2	81.3	81.7	82.8	1.55	(79.1, 86.5)	-1.1
1105	BL	81.3	79.2	83.3	79.2	82.3	31.1*	84.8	1.23	(81.9, 87.7)	-3.7
	СН	87.5	83.3	83.3	84.4	88.5	85.4	88.5	1.67	(84.6, 92.4)	-3.1
	SN	82.3	76.0	82.3	80.2	74.0	79.0*	82.2	0.80	(80.3, 84.1)	-3.2

<sup>a - First session for this listener.
b - Second session for this listener.
* - Below 95% confidence interval.</sup>

Table 6b. In-House and Dynastat DRT Scores. Listening Session 3 - 4 Mar 1976

The state of the s

	1		IN-HCUSE							
			LISTENER		NFR					ŀ
System	Speaker	34	44	64	78	MEAN	MEAN	S.E.	95% C.I.	510
1106	BL	82.3	86.5	93.8	80.2	85.7	87.B	1.70	(83.3, 91.8)	-2.
	СН	88.5	90.6	90.6	83.3	88. 👀	91.7	0.86	(89.7, 93.7)	-3.4
	SN	74.0	83.3	91.7	77.1	81.5	82.2	1.89	(77.7, 86.7)	-0.
1108	BL	36.5	86.5	92.7	84.4	88.0	88.2	1.69	(84.2, 92.2)	-0.:
	СН	88.5	95.8	90.6	88.5	90.1*	91.9	0.73	(90.2, 93.6)	-1.4
	SN	76.C	89.6	87.5	82.3	83.9	85.9	1.73	(81.8, 90.0)	-2.1
:110	BL	86.5	89.6	87.5	86.5	87.5*	92.6	1.05	(90.1. 95.1)	-5.:
	СН	85.4	87.5	93.8	83.3	87.5*	93.0	0.70	(91.3, 94.7)	-5.
	SN	76.0	86.5	82.3	82.3	81.8	83.7	1.57	(79.5, 86.9)	-2.0
1112	BL	86.5	93.8	91.7	85.5	90.1*	92.4	0.67	(90.8, 94.0)	-2.
	CH	90.6	87.5	92.7	95.8	91.7*	94.8	1.08	(92.2, 97.4)	-3.
	SN	85.4	88.5	87.5	84.4	86.5	87.0	1.59	(83.2, 90.8)	-0.

a - Second session for this listener.* - Below 95% confidence interval.

Table 6c. In-House and Dynastat DRT Scores. Listening Session 4 - 22 Mar 1976

		IN-HOUSE LISTENER		DYNA	STAT					
	1	LISTENER			VER					
System	em Speaker	18	2þ	19	53	MEAN	MEAN	S.E.	951 C.I.	DIFF
1113	BL	90.6	86.5	89.6	85.4	88.0	90.1	0.90	(88.0, 92.2)	-2.1
	СН	92.7	89.6	89.6	91.7	90.9	92.2	0.65	(90.7, 93.7)	-1.3
	SN	80.2	86.5	89.6	83.3	84.9*	88.0	1.15	(85.3, 90.7)	-3.1
1146	BL	90.6	87.5	88.5	86.5	88.3*	90.8	0.80	(88.9, 92.7)	-2.5
•	СН	92.7	92.7	92.7	92.7	92.7	94.8	0.88	(92.7, 96.9)	-2.1
	SN	81.3	84.4	87.5	86.5	84.9*	91.3	1.16	(88.6, 94.0)	-6.4
1150	BL.	87.5	85.4	96.9	85.4	88.8	88.4	0.89	(86.3, 90.5)	+0.4
	СН	92.7	90.6	90.6	92.7	91.7*	94.4	0.71	(92.7, 96.1)	-2.1
	SN	84.4	81.3	85.4	86.5	84.4*	88.8	1.14	(86.1, 91.5)	-4.4
1152	BL	88.5	91.7	94.8	89.6	91.2	92.2	0.81	(90.3, 94.1)	-1.0
	СН	92.7	88.5	89.6	88.5	89.8*	92.8	0.80	(90.9, 94.7)	-3.0
	SN	85.4	83.3	85.4	88.5	85.7	87.4	1.05	(84.9, 89.9)	-1.7

a - Second session for this listener.
 b - Third session for this listener.
 c - Below 95% confidence interval.

3.3.2 REPEATABILITY

During the three listening sessions in October 1976 seven listeners were exposed repeatedly to the same DRT tape. Speaker CH was used for all repetitions. Table 7 contains a summary of the number of repetitions each listener participated in for each of the three sessions. Table 8 contains the mean and standard deviation across repetitions for each listener for each session. For those listeners that participated in two sessions the tendency was for the mean score to rise slightly and the standard deviation to decrease. This is what might be expected from listeners who are relatively inexperienced and are still rising on the "learning curve." A simple linear regression model was fitted to the data for each listener for each session. The independent variable was the repetition number; the dependent variable the DRT score. The intent was to examine the slope of the regression line to determine if a significant linear trend in the listeners' scores existed. Table 9 contains the intercept and slope for each listener as well as a 95 percent confidence interval for the slope of each line. The confidence interval did not contain zero in only two of the twelve cases. This means that the slopes of the remaining ten lines are not significantly different from zero indicating no significant learning trend. Further analysis consisted of computing the DRT mean and standard error across listeners for each repetition during the first and last listening sessions. Table 10 contains these results. Figure 6 is a scatter diagram of this data and contains a linear regression line for each session. The slope of each of these lines is significantly different from zero, however, it can be observed that the rate of increase is smaller for the third session than for the first session. Additionally, the standard errors in Table 10 are reducing and becoming more consistent as the listeners gain experience. Also included in Figure 6 is a 95 percent confidence interval for the mean score for speaker CH based on the mean obtained by Dynastat for the same tape used in our in-house sessions. A reliable estimate for the standard error for this score is not available. However, typical standard errors obtained by Dynastat for speaker CH when the mean is near 93.0 are less than 1.00. The confidence interval shown in Figure 6 was constructed using an estimated standard error of 0.75. All in-house scores for the 20 October 1976 session lie within the confidence interval as well as four of the last five scores on 6 October 1976,

The foregoing results led to the conclusion that a properly selected and trained listening crew used in an in-house program could produce results that are not only repeatable but also comparable to those obtained by Dynastat.

Table 7. Number of DRT Repetitions Listeners Were Exposed to for Speaker CH

Listener	6 Oct 76	12 Oct 76	20 Oct 76
4	9	0	9
8	9	0	9
9	9	9	0
10	9	0	9
11	9	8	0
13	0	0	12
14	0	0	12

Table 8. DRT Means and Standard Deviations Across Repetitions for Each Listener at Each Session

	6 (ct 76	12 (Oct 76	20 Oct 76		
Listener	Mean	5td Dev	Mean	Std Dev	Mean	Std Dev	
4	93.3	28			95.0	1.25	
8	95.6	1.86		-	96.8	0.63	
9	92.0	1.80	92.6	2.05		-	
10	91.6	3.10	-		92.9	1 79	
11	87.0	4,00	92.1	1.66		-	
13		-			91.7	1.89	
14					95.3	2.79	

要を本面は12、20年の自然の関係の関係のは、12年の表別のでは、19年のでは、19

^{*}First exposure to the DRT for this listener.

Table 9. Simple Linear Regression Models for Repetition (X) and DRT Score (Y) for Each Listener

		6 OCT 76			12 OCT	76	20 OCT 76		
Listener	Intercept	Slope	95% C.1. for Slope	Intercept	Slope	95% C.I. for Slope	Intercept	Slope	95% C.I. for Slope
4	92.9	0.07	(-0.67, 0.81)	-	-	•	94.6	0.09	(-0.31, 0.49)
8	94.1	0.30	(-0.25, 0.84)	-	-	•	96.1	0.14	(-0.02, 0.30)
9	90.4	0.33	(-0.18, 0.84)	90.2	0.49	(-0.02, 0.99)		-	•
10	86.9	0.94*	(0.37, 1.50)	-	-		90.9	0.40	(-0.06, 0.86)
11	82.5	0.90	(-0.21, 2.01)	92.8	-0.16	(-0.82, 0.50)		-	
13	-		•	-		-	91.2	0.07	(-0.29, 0.44)
14							90.7	0.71*	(0.50, 0.93)

 $ext{*Slope}$ significantly different from zero.

Table 10. DRT Mean and Standard Error Across Listeners for Each Repetition for First and Last Sessions

	6	Oct 76	20 Oct 76			
Repetition	Mean	Std Error	Mean	Std Error		
1	88.3	2.01	93.8	0.81		
2	90.4	2.47	92.9	1.29		
3	91.3	2.12	93.3	1.07		
4	94.2	0.78	94.0	1.06		
5	92.1	1.50	94.2	1.38		
6	90.8	2.04	94.0	0.83		
7	92.9	0.77	94.2	1.49		
8	93.3	1.38	95.0	1.01		
9	93.7	1.47	94.8	1.19		

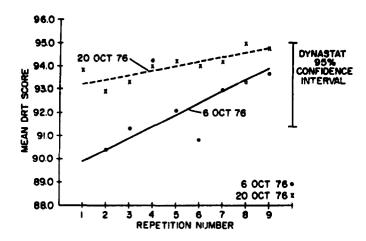


Figure 6. Scatter Diagram and Linear Regression for Mean DRT Score as a Function of Repetition Number

3.4 Conclusions and Recommendations

It was concluded that the DRT scoring software as implemented on the CSP-30 functioned properly, however, the manual entry of the raw data was unsatisfactory. A six speaker, ten listener DRT required approximately two hours to enter the data. The CSP-30 is a single user system, the primary function of which is research and development of voice algorithms. To dedicate the CSP-30 to the time required to enter DRT data is a waste of a valuable resource. In addition, this method of data entry proved to be susceptible to key punch errors. It was recommended that the DRT scoring software be implemented on an existing in-house PDP-11 mini-computer. It was further recommended that an optical mark reader be procured and interfaced to the PDP-11 and that special DRT test forms be designed so that automated data entry could be used in the scoring procedure.

It was further concluded that a listening crew could be trained in-house to perform in a consistent manner and obtain results comparable to those obtained by Dynastat. However, it was considered unsatisfactory to depend on volunteer listeners. Our experience was that it was difficult to obtain volunteers who were willing or able to participate in DRT listening the number of hours and frequency required for them to become consistent, reliable listeners. It was recommended that listeners be hired and that they participate in listening tests a minimum of one-half day each week.

It was further recommended that procedures be developed to recruit, train, and control the listeners and to monitor their performance. In addition, the

development of a method for screening and eliminating those listeners who are unsatisfactory was required.

4. FOLLOW-ON DEVELOPMENT

The decision was made to fully develop the in-house DRT program. The recommendations of Section 3.4 were adopted and implemented. The following Sections describe this development.

4.1 Optical Mark Reader

A search through several issues of the Excess ADP Equipment Bulletin published by the Defense Logistics Agency, Cameron Station, Alexandria, VA 22314 revealed that two (2) Decision Optical Mark Readers (OMR), model OMR 6510 were listed as excess. Further investigation revealed that these readers were located within ESD on Hanscom AFB. Contact with the users was immediately established. A review of the OMR documentation and discussions with the users resulted in the determination that the OMR could easily be interfaced with our PDP-11 and that forms could be designed and procured to satisfy our requirements. A no cost transfer of the OMRs to the Voice Processing Facility was accomplished. It was immediately learned that the interface hardware required was already available in our PDP-11. All that was required was to plug an existing connector into the OMR.

4.1.1 OMR TEST BOOKLETS

DRT test booklets were designed and procured for use with the OMR. Two different test booklets were procured; one for the 100 series word lists (ESD Form 36) and one for the 300 series word lists (ESD Form 37). Each booklet consists of four (4) pages joined together at the left edge by a perforated binding. This is referred to as a four part snapak. This allows the pages to be separated so that they may be fed into the OMR. Figure 7 is a copy of a page from one of the booklets. The only differences between this page and other pages are the words themselves and the position of the black rectangle in the upper right hand corner. This rectangle is used to indicate the booklet page number by it's location. The listeners are required to fill in certain header information on the first page of each booklet before the test begins as indicated in Figure 7. The information is entered by first writing it in the large boxes to the left of each information block. The listeners then blacken in the appropriate rectangles using a No. 2 pencil. During the test listeners strike through the word of their choice as before. After much experimentation it was determined that wide, dark marks are required over the words for reliable OMR reading. A certain amount of practice was required before the listeners

mastered the technique of proporty marking the words. The time required for this practice was minimal when compared to the total listener training period. It was determined that the best marker to use is a black tube-type, felt-tip marker, Federal Stock Number 7520-00-973-1059. These markers are available in adequate supply and if stored tip down between listening sessions have a reasonable usable life. Rectangles in the extreme left and right hand margins of each test booklet page are provided to give the listener an opportunity to change his answer by simply marking through the rectangle closest to the word pair to be changed. The test form pages measure 8-1/2 in. X 11 in. after separation. They were designed on a 5446 Decision format sheet (54 columns by 46 rows). The forms were printed using Pantone Purple 185 ink (12 parts warm red, 4 parts rubine red). Complete specifications for the forms are available in the Hanscom Air Force Base, Central Base Administration (DA) office.

4. 1. 2 SOFTWARE

The software functions required to interface the OMR to the PDP-II and provide data that can be used by the DRT scoring software consisted of:

- a. An OMR driver. This function is required to do the necessary handshaking between the OMR and the PDP-11 interface card (DC-11) and to send and receive necessary status, control, and data words.
- b. A page reader. This software module is required to store an image of the test booklet page being read. It consists of filling in a 46×54 matrix of zeroes and ones. Each element of the matrix corresponds to a position on the test form page. A zero indicates no mark in that position, a one indicates a mark.
- c. A page interpreter. This module interprets the matrix of zeroes and ones constructed by the page reader and extracts the following information:
 - I. System ID.
 - 2. Listener ID.
 - 3. Word List ID.
 - 4. Speaker ID.
 - 5. Page number.
 - 6. The responses. These are stored in a similar manner as the CSP-30 version.

These functions are drawn together into a program called XXX on the PDP-11 disk file. The output of this program is a disk file containing the data described above. In addition, a program called XFER is used before actual scoring takes place. This program accesses the data file created by XXX and creates a new file after performing the following:

d. Translates the XXX file into a new file in the format required for the scoring program.

DIAGNOSTIC RHYME TEST

AY	MONIH	YEAR		
	SYSTEM	WORD LIST	LISTENER	
6 1	8 3 8 5 5 8 8 9	0 9 3 3 6 6 8 8	0 9 3 3 8 8 8 8 8	
ō į			0 9 0 3 0 9 0 0 0	
_1	4 3 4 3 8 F 8 8	0 9 9 9 9 9 9 9 9	0 9 8 0 3 8 0 2 6 8	
	13811899	3 9 9 9 9 9 9 9 8	0 9 0 3 9 8 8 8 9	
l.**_=	***************************************		22626666	
SPEA	KEB			
_		8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8		
		56999991192911		
<u>ئد' لم.</u> .	-?_ <u>5_5</u>	<u> </u>		
£.	808 · · G	08	1001 - COOT	
í	TAUNT - D	AUNT	POND - BOND	
-	8001 M	001	BONE - MOAN	
-	CHEAT SH	HEET	BILL — VILL	
e,	GAB - JA	8	GUEST - JEST	
-	TOT PO	זכ	THOUGHT - FOUGHT	
-	BOAST - G	HOST	POOP - COOP	
Ĺ	NILL RI	ιι	REAP - NEAP	
:	SAID - Z	ED	FAST VAST	
P	DAW - G	NAW	DOCK - KNOCK	
^	CHOOSE - S	HOES	DOZE - THOSE	
	KEFP C	HEEP	THING - SING	
Ĺ	DANK B	ANK	NET - MET	
G	DOT - G	or	TAUGHT - CAUGHT	
ċ	NOSE IN	QSE .	RUDE NUDE	
r L	fint - D	INT	PEEN - BEAN	
?	DECK - N	ECK	BAD - MAD	
-	TONG T	HONG	BOX - VOX	
5	(00 (ноо	GO - JOE	
-	REED V	vEED	DID - BID	
í	SAG = S	HAG	WREN - YEN	
-	RO8 - K	NO8	NOUGHT - WROUGHT	
	FOAL - V	OLE	SUE - 200	
:	DIP - M	416	DEED - NEED	
	PENCE - F	ENCE	DAN - THAN	
J	THAW - S	AW	COP - CHOP	
	1001 - F	2001	THOR - FORE	
•	WIELD - 1	TELD	FIT — HIT	
	RAT C	TALA?	REST - NEST	

Figure 7. DRT Test Booklet for Use With the Optical Mark Reader

- e. Offers the opportunity to correct word list identification that may have been entered incorrectly.
 - f. Permits the elimination of selected listeners from the scoring run.
- g. Permits the elimination of selected speakers from the scoring run. The final step in the process is the execution of the scoring program itself. This program is called SCORE and is substantially the same as implemented on the CSP-30. The fundamental differences are:
- h. It has been modified to accept data from the disk file rather than the ADDS terminal.
- i. The printout of results has been expanded to include a page which consists of a matrix of listener/speaker scores.

Appendix C contains the listings for the above described software and an example DRT printout.

4.2 Program Usage

A step-by-step procedure for using the DRT scoring software follows. It is assumed that the operating system is the RSX-11M and the user is familiar with it. The scoring programs have been written to prompt the use by asking specific questions and waiting for a reply. Also, various error messages are written on the Decwriter when OMR read errors occur. Figure 8 is a copy of the Decwriter output for a DRT scoring run. The example in Figure 8 is for a single listener and a single speaker. Items marked with an asterisk (4) are entered by the user. Figure 9 is the resulting printout of the scoring process for this example. Before starting the procedure the test booklets should be prepared by first arranging them so that the speakers are in the same order for each listener. It is convenient, but not necessary, to arrange the speakers alphabetically and the listeners numerically. Listeners are identified by the last four digits of their social security account number. After arranging the booklets in the desired order the bindings should be removed so that the pages separate:

- a. Turn the OMR on and press the feeder clear and reset buttons.
- b. Run program XXX and follow instructions printed on the Decwriter. (See Figure 8.)
 - c. Enter date of test.
 - d. Enter up to 50 ASCII characters describing the system tested.
- e. A disk write option is then selected. If a 1 is entered a disk file will be created. If Ø is entered no file is created. This option is useful for checking the OMR or forms alignment. See paragraph f below. Normal operation is to enter a 1.
- f. A line printer output option is then selected. A Ø will cause no line printer output. A 1 will cause a printout to be made of the matrix of zeroes and ones for

each test booklet page. This option is selected when checking forms alignment and OMR operation. Normal procedure is to enter a \$\mathcal{p}\$.

- g. Follow instructions for entering the number of listeners and speakers and the system identification number.
- h. Follow instructions for entering the word list key and speaker identification. This has been added to eliminate the need for the listeners to blacken in the rectangles on their test booklets corresponding to this information. They should continue to write this information in the large boxes to the left of the rectangles.
- i. After entering all word list keys and speakers they will be typed out on the Decwriter for verification. Carefully check their accuracy. If there is an error start over by aborting XXX. This is accomplished by typing in C while holding the CRTL key down followed by ABORTXXX after the MCR prompt. If the word list keys and speakers are correct type in RESUME followed by a carriage return.
- j. At this time the pages are manually fed into the OMR. Each page should be placed face down on the glass platen with the header end of the page against the paper gate. After the page is read it is removed from the platen and the next page placed in position. This process is repeated until all pages are read. After the last page is read a blank page (could use reverse side of last page) is placed on the platen and read. This will cause the program to pause.
- k. After the pause, if more pages are to be read in enter a 0. If the scoring run is complete enter a 1. A printout of "bad marks" is made on the Decwriter. These numbers are the number of listener responses not read by the OMR for each listener. This information is used when training new listeners to master the technique of using the markers and to detect OMR read problems. After this printout, XXX stops.
- 1. Various error conditions can occur while reading pages in. These may be due to the pages being read in the wrong order, a page not properly aligned over the glass platen, or a page read in twice. Error messages are printed on the Decwriter for each of these conditions. Simply correct the problem and type in RESUME.
- m. The next step in the process is to execute XFER. Run XFER in the usual way (see Figure 8) and follow instructions.
- n. The final step is the actual scoring. Run SCORE and follow instructions. Be sure the line printer is on-line. The result will be a disk file called FOR \$\phi6\$ DAT containing the scored DRT results. Output this file to the line printer using PIP to obtain hardcopies.

```
# RUN DF:XXX
  ENTER DATE OF TEST DD-MMM-YY (15-NOV-77) :21 MAR 78
  THIS IS WHAT YOU SAID... 21 HAR 78
  ENTER HEADER INFO...A50
 DRT SCORING EXAMPLE
  ***COPY TO DISK?..TYPE O FOR NO, 1 FOR YES
  ***COPY TO PRINTER? .. TYPE O FOR NO; 1 FOR YES
  ENTER #LISTENERS, #SPEAKERS, #SYSTEM., 121214
  FOR EXAMPLE:08061104 FOLLOWED BY CARRIAGE RETURN
% 01011000
  ENTER KEY AND SPEAKER (E.G.: 102RBV) FOR SPEAKER 1
後 304BBV
  CHECK THE KEYS ...
  304BBV
  TTO -- PAUSE **** READY TO GO ****
  >RES
   EOF. ENTER 0 TO GO OR 1 TO STOP
  BAD MARKS, MARKS % ...
                            1.
                                  232.
  ****SYSTEM # 1000
                      O ERRORS
                                x 0.0
  LISTENER 1277
  TTO -- STOP *** FINISHED ***
  RUN DF:XFER
  ENTER SYSTEM ID ... 14
 1000
  21 MAR 78 DRT SCORING EXAMPLE
  HOW MANY LISTENERS TO DELETE?... 12
  HOW MANY SPEAKERS TO DELETE?.. 12
  ENTER ANY INCORRECT-CORRECTED KEY PAIR (O IF OK)
  TTO -- STOP
```

Figure 8. Sample Decwriter Output During DRT Scoring on PDP-11

SYSTEM TESTEDS 1888 21 MAR 78 DRT SCORING EXAMPLE

NUMBER LISTENERS # 1

FOR LISTENER: 1277 .

SPKR SCORE

8V 98,62

MAIN ATTRIBUTES	PRESENT		AR	BENT	TOTAL		
	MFAN	S'.E'.	MEAN	8,E.	MEAN	5 E.	
VOICING	100.00	a . a p	75,00	е,еп	A7.50	0.00	
FRICTIONAL	100.00	9.00	75, 00	0.00	87.50	0,66	
NON-FRICTIONAL	100,00	0.00	75, 99	ดู้หล	87.50	P.00	
HASALITY	180.00	9,00	199.94	P.PP	102.00	0.00	
GRAVE	188.80	0.00	109 00	0.00	100.00	0.00	
ACUTE	140.00	0.00	199,99	0.00	1 40 , 94	0.88	
SUSTENTION	188.88	0,00	87.50	9.99	93,75	P.98	
VOICED	100,00	94.9	75. AA	กิดด	87.50	9.00	
UAAOICED	100,00	0,00	100.00	P . BB	160,00	0.00	
SIBILATION	87.50	0.00	144.44		93,75	0.00	
VOICED	75.00	0.00	104 40	A. 0A	87.50	0.00	
UNVOICED	100,00	0,00	100.00	P. AP	188,98	n, 69	
GRAVENESS	87,50	คู่คด	75.00	0.00	81,25	9,00	
VOICED	75.00	0.00	100.00	0 0	87.50	0,00	
NAAOICED	100.00	0.00	59.00	0,00	75.00	ଉ , ଶର	
COMPACTNESS	100.00	9,00	75.00	P.88	87.50	0.00	
VOICED	100.00	Й, ВО	100,00	0.00	100.00	0.00	
UNVOICED	100.00	0,00	80.00	0.00	75.09	0,66	
POTALS	95,83	ភ. ភេទ	85,42	8.88	90.62	n '.nn	
		******	*******				
		. MEAN .	90.62 +				
TOTAL D	RT SCORE		•				
		. 3'.E'.	0,00 .				
		******	********				

Figure 9. Sample Printout Resulting From DRT Scoring on PDP-11

SYSTEM TESTED: 1888 - 21 MAR 78 DRT SCORING EXAMPLE

NUMBER LISTENERS .

FOR SPEAKERS BY

LISTENER

SCORE

1277

98.69

MAIN ATTRIBUTES	PR	ESENT	48	BENT	TOTAL		
	MEAN	8',E'	MEAN	8,8,	MEAN	3,6,	
VOICING	188.88	0'. 00	75.80	n.,na	87.50	A. 06	
FRICTIONAL	100.00	0.08	75.AP	A, 00	67.50	0.00	
NON-FRICTIONAL	100.00	P , RP	75, 86	ମ୍ୟର	87,50	0,00	
NASALITY	199.09	0,50	188.88		100.00	0.00	
GRAVE	100,00	P . PF	100,00	0,00	1 00.00	0.00	
ACUTE	186.86	9.59	100,00	A . O A	100.00	8,86	
SUSTENTION	100.00	9, 88	87.58	9.98	93.75	96.9	
VOICED	100.68	9.66	75,00	A . 8 A	87.50	0.00	
UNVOICED	100.00	я, ея	100.00	9, 88	100.00	8,00	
SIBILATION	87.5A	9 . AA	188.88	0.00	93,75	0.60	
VOICED	75.80	P.88	100 00	0,60	87.58	9.00	
UNVOICED	140,00	0,00	100.00	0.00	100,00	8,00	
GRAVENESS	87.5P	8,80	75.00	6.66	A1.25	0.00	
VOICED	75.88	0.00	100.00	0,00	87,58	0.00	
UNVOICED	100,00	P ,88	50.00	0.88	70,00	0,00	
COMPACTNESS	100.00	0.00	75.00	P. 8B	87.50	0.00	
VOICED	100.00	F.86	190.00	0,00	100.00	0.00	
UNVOICED	198,98	0.60	58 . 00		75,00	0,00	
TOTALS	95.83	9 <u>.</u> 68	85,42	P.88	90.62	A . A 6	
		******	******				
		. MEAN .	98.62 •				
TOTAL DE	RT SCORE!	•	•				
		• 5'.E'. •	0.00 •				
		******	•••••				

Figure 9. Sample Printout Resulting From DRT Scoring on PDP-11 (Cont)

SYSTEM TESTED: 1888 21 MAR 78 DRT SCORING EXAMPLE

NUMBER LISTENERS = 1 NUMBER SPEAKERS = 1

COMBINED RESULTS - STANDARD ERRORS ACROSS SPEAKERS AND LISTENERS

MAIN ATTRIBUTE:	Pf	PESENT	ABI	BENT	TOTAL	
	MEAN	S'.E'.	MEAN	8,2,	MEAN	8.E.
VOICING	100.0)	0.00	75.66	0.00	87.56	0,00
FRICTIONAL	100.00	A . A .	75,00	0,00	87,56	0.00
NON-FRICTIONAL	100.00	9.00	75.0A	0.00	87.58	6.00
NASALITY	100,00	0'.0F	100,70	0.00	180.88	8.00
GRAVE	100,00	0,00	100,00	0.00	100.50	0.00
ACUTE	188.88	A . A B	100.00	อ. ดถ	100.00	0.00
SUSTENTION	180,00	0'.00	87.50	M. MB	03.75	A.88
VOICED	160.60	P. FD	75,00	P.88	87,50	0.00
UNVOICED	100.00	H. FF	199.86	0'. PM	100.00	0.00
SIBILATION	87.50	n'.en	100.00	0,00	93,75	0,00
VOICED	75,88	8,88	100,00	0,00	87.50	0.00
UNVOICED	100.00	A, A8	100.00	M.80	100,00	0,00
GRAVENESS	87.50	n'. ne	75.00	P.00	A1.25	0.00
VOICED	75,88	0,00	100.00	0.00	87.50	0.00
UNVOICED	188,88	0.50	50,00	P'. 0A	75.00	0.00
COMPACTNESS	100,00	8.80	75.RB	8.00	87.50	a , e e
VOICED	188.86	0,00	100,00	6,00	100.00	0.00
UNVOICED	100,00	6.66	58.00	0,00	75,00	P.86
TOTALS	95,83	6'.00	85.42	9,98	97.62	9.06
		******	*******			
		. MEAN	98.62 +			
TOTAL DI	RT SCORE		•			
		. 8'.E'.	9.88 +			
		******	********			

8 7

MEAN ON.68

8.E. 0.88

Figure 9. Sample Printout Resulting From DRT Scoring on PDP-11 (Cont)

```
SYSTEM 1868 91 MAR 78 DRT SCORING EXAMPLE

NUMBER LISTENERS = 1

NUMBER SPEAKERS = 1

SPEAKERS

BV

LIST.

1277 98.82 98.82 8.89

MEAN 98.62

S.E. 9.88
```

Figure 9. Sample Printout Resulting From DRT Scoring on PDP-11 (Cont)

4.3 Listeners

4.3.1 LISTENER BEHAVIORAL CONTROLS

A study was made to determine those controls required to minimize the effects of listener behavior on the DRTs conducted in-house. The study included a search of the applicable literature and a personal interview with Dr. W. D. Voiers, one of the creaters of the DRT. A report of this study is included as Appendix D. In addition, a committee was formed to make a determination as to the applicability of AFR 80-33, Use of Volunteers in Aerospace Research to the in-house DRT program. The committee found that the provisions of AFR 80-33 do not apply. A report of these findings is on file at the COMSEC Engineering Office.

4.3.2 RECRUITING

Listeners were recruited by advertising in local newspapers during November 1976. Over one hundred responses were received. Initial screening was accomplished by administering a pure tone audiometric test as was done during the trial period earlier in the year. Those who did not pass the test were not considered for the job. The nature of the work was explained to each application. They were offered \$2.50 per hour for one-half day (4-1/2 hours) per week with the understanding that they must successfully complete a training period and that they were subject to removal from the program at any time if their performance was not consistent and reliable. The first eighteen that qualified and were willing entered a training program. Approximately 50 names were retained on a backup list. Since then the 50 names have been exhausted to replace listeners (many did not want the job when called back several weeks later). On one other occasion an advertisement in the newspaper was used again to recruit listeners. Other than that one time, word of mouth through the listening crew has been adequate to recruit replacement listeners.

4.3.3 TRAINING

A training program consisting of four sessions, each four and one-half hours in length, was conducted during December 1976. Of the eighteen listeners who started the program, three quit after the first session, two after the second session, and four were not accepted for the job after the fourth session. The remaining nine stayed on as part of the listening crew. A second training period consisting of three sessions, each four and one-half hours in length, was conducted in January 1977. Five candidates from the backup list participated. Two quit after the second session, the remaining three became part of the listening crew. Of the twelve who were selected four are still part of the listening crew after one year. The remaining eight quit at various times. The first left after 22 weeks. The mean length of time these eight listeners stayed on the crew was 30 weeks. Replacements were recruited and trained as required.

4. 3. 3. 1 Training Material

Training material consisted of repeated applications of two three-speaker DRTs that had been processed by two different narrowband vocoders. The two DRTs were administered 13 times during the December training program. Fifteen single speaker tests were administered the first session and 21 on each of the remaining sessions. After three sessions it was clear which listeners would not be selected, therefore, the January training program consisted of only three sessions. The same training material was used. Fifteen single speaker tests were administered during the first session and 21 the second and third sessions. The speakers were heard repeatedly in the order: BV JE RD BL SN CH. The first three speakers had been processed by a tenth order Linear Predictive Vocoder (LPC)⁶ at a 3.6 kbps data rate, the last three by TRIVOC (4-14)⁷ at 2.4 kbps. These DRTs had been previously evaluated by Dynastat. Table 11 contains the mean DRT scores and standard deviations obtained by Dynastat for each of the systems used during the training.

Table 11. DRT Scores Obtained by Dynastat for the Test Material Used During In-House Training Program in December 1976 and January 1977

System	Speaker	Mean	Standard Deviation*
1104 (LPC)	вч	86.1	2.80
(LPC)	JE	84.6	1.53
	RD	89.7	1.32
2003 (TRIVOC)	BL	87.2	1.61
	SN	86.8	2.88
	СН	95.2	1.64

*Standard deviations were computed from furnished standard errors using the formula

Standard Error = Standard Deviation

where

N = number of listeners.

^{6.} Wiggins, R. II. (1976) Narrowband Digital Voice Processing (CSP-30 LPC Software Documentation), Volume I, ESD-TR-76-282.

^{7.} Roberts, J. E., Smith, C. P., and Wiggins, R. H. (1975) Triple-function voice coder (TRIVOC), J. Acous. Soc. Am. 57 Suppl. 1:535.

4.3.3.2 Training Results

Time and space does not permit complete exposure of the results for every listener who entered the training program in this report. Three listeners were randomly selected to illustrate the kinds of results obtained during the training. Listener 3299 participated in the December 1976 training period and was not selected to continue in the program. Table 12a contains a summary of all DRT scores achieved by this listener. Listener 5699 also participated in the December training. This listener's scores are contained in Table 12b. Listener 5699 was selected to continue in the program and remained with the listening crew for 25 weeks. Listener 9557 was a member of the January training group. Scores for this listener are contained in Table 12c. Listener 9557 was selected and continues to be a member of the crew after 14 months. Tables 12a, b, and c also contain entries for the last two training sessions which are the number of standard deviations the listeners' DRT scores are from the Dynastat scores. These entries are based on the data in Table 11. Table 13a is a summary of the number of times each listeners' score was two or more standard deviations below Dynastat. Table 13b is a summary of the number of times each listeners' score was three or more standard deviations below Dynastat. Over half the time listener 3299 scored more than three standard deviations below Dynastat. In addition, this listener did not perform consistently as can be observed in Table 12a. For these reasons listener 3299 was not retained. Listener 5699 was above three standard deviations below Dynastat over 80 percent of the time. Listener 9557, after only three training sessions, scored above three standard deviations below Dynastat over 70 percent of the time. Both of these listeners scored above Dynastat on several occasions. In addition, except for an occasional "outlier", both of these listeners were consistent. These two listeners were selected to continue. These results are representative of all who participated in both the December and January training periods. Those who were eliminated from the program performed as did listener 3299. Those who were selected performed in a similar manner as listeners 5699 and 9557.

Table 12a. Training History for Listener 3299. Top number is DRT score. Botton number (for last two sessions only) is number of standard deviations listener score is from Dynastat score

						REPI	TITION NO	JMBER					
Speaker	1	2	3	4	5	6	7	8	9	10	11	12	13
В۷	61.5	71.9	74.0	74.0	71.9	70.8	78.1 -2.36	76.0 -3.61	78.1 -2.86	68.8 -6.18	77.1 -3.21	77.1 -3.21	80.2 -2.11
JE	68.8	74.0	79.2	70.8	76.0	78.1	78.1 -4.25	82.3 -1.50	79.2 -3.53	85.4 +0.52	83.3 -0.85	76.0 -5.62	81.3 -2.16
RO	80.2	78.1	78.1	77.1	82.3	79.2	83.3 -4.85	86.5 -2.42	84.4 -4.02	85.4 -3.26	83.3 -4.85	87.5 -1.67	88.5 -0. 91
8L	69.8	69.8	71.9	80.2	83.3	78.1	74.0 -8.20	75.0 -7.58	83.3 -2.42	77.1 -6.27	85.4 -1.12	79.2 -4.97	83.3 -2.42
SN	68.8	76.0	69.8	81.3	76.0	74.0	81.3 -1.91	78.1 -3.02	80.2 -2.29	d2.3 -1.56	82.3 -1.56	77.1 -3.36	79.2 -2.64
Сн	90.6	85.4	83.3	89.6	87.5	84.4	88.5 -4.09	67.5 -4.70	89.6 -3.41	93.8 -0.85	86.5 -5.30	88.5 -4.09	86.5 -5.30
	2 Dec	e nit e r	.	a Dec	ncoen			16 Decem	ber		20 Dec	ember	

Table 12b. Training History for Listener 5699. Top number is DRT score. Bottom number (for last two sessions only) is number of standard deviations listener score is from Dynastat score

						REPT	TION NUM	BER					
Speaker	1	2	3	4	5	6	7	8	9	10	11	12	13
87	71.9	83.3	81.3	82.3	82.3	82.3	81.3 -1.71	82.3 -1.36	85.4 -0.25	82.3 -1.36	80.2 -2.11	87.5 +0.50	85.4 -0.25
JE	76.0	78.1	79.2	78.1	81.3	78.1	80.2 -2.88	83.3 -0.85	74.0 -6.93	81.3 -2.16	77.1 -4.90	79.2 -3.53	79.2 -3.53
RD	89.6	86.5	90.0	91.7	88.5	87.5	87.5 -1.67	90.6 +0.68	92.7 +2.27	88.5 -0.91	90.6 +0.68	92.7 +2.27	90.6 +0.68
8L	84.4	86.5	86.5	86.5	85.4	82.3	84.4 -1.74	85.4 ~1.12	83.3 -2.42	87.5 +0.19	84.4 -1.74	86.5 -0.43	84.4 -1.74
SN	74.0	77.1	75.0	81.3	81.3	76.0	81.3 -1.91	83.3 -1.22	81.3 -1.91	79.2 -2.64	81.3 -1.91	77.1 -3.37	84.4 -0.83
СН	88.5	95.8	91.7	90.6	94.8	87.5	93.8 -0.85	88.5 -4.09	88.5 -4.09	90.6 -2.80	90.6 -2.80	92.7 -1.52	94.8 -0.24
	2 0ec	ember		9 Dec	emier			16 Dece	mber]	20 Dec	ember	

Table 12c. Training History for Listener 9557. Top number is DRT score. Bottom number (for last two sessions only) is number of standard deviations listener score is from Dynastat score

				REPITI	TION NUME	ER				
Speaker	1	2	3	4	5	6	7	8	9	10
В٧	67.7	83.3	78.1	83.3 •1.00	88.5 +0.86	87.5 +0.50	84.4 -0.61	83.3 -1.00	80.2 -2.11	82.3 -1.36
JE	71.9	83 .3	83.3	77.1 -4.90	82.3 -1.50	81.3 -2.16	83.3 -0.85	82.3 -1.50	79.2 -3.53	82.3 -1.50
RO	78.1	90.6	86.5	91.7 +1.52	89.6 -0.08	94.8 +3.86	92.7 +2.27	91.7 +1.52	88.5 -0.91	93.8 +3.11
BL	72.9	82.3	77.1 -6.27	81.3 -3.66	85.4 -1.12	81.3 -3.66	82.3 +3.04	79.2 -1.37	83.3 -2.42	
SN	61.3	83.3	71.9 -5.18	79.2 -2.64	81.3 -1.91	83.3 -1.22	81.3 -1.91	78.1 -3.02	83.3 -1.22	
СН	87.5	93.8	89.6 -3.41	91.7 -2.13	91.7 -2.13	91.7 -2.13	81.3 -8.48	89.6 -3.41	91.7 -2.13	
! _	6 Jan	uāry		13 Ja	nuary _			0 January	·	

Table 13a. Number of Times Listeners' Score Was <u>Two</u> or More Standard Deviations Below Dynastat Score (last two sessions only)

ļ	Ĺ	Listener	
Speaker	329 9	5699	9557
ВУ	7	1	1
JE	4	6	3
P.D	5	0	0
BL	6	1	6
SN	4	2	3
СН	6	4	7
Total	32 (76‡)	14 (331)	20 (481)

Table 13b. Number of Times Listeners' Score Was Three or More Standard Deviations Below Dynastat Score (last two sessions only)

		Listener	
Speaker	3299	5699	9557
BV	4	0	0
35	3	4	2
RD	4	0	0
CL	4	0	5
SN	2	1	2
СН	6	2	3
Total	23 (55%)	7 (17%)	12 (29%)

5. PERFORMANCE OF IN-HOUSE DRT.

As discussed earlier in this report, it is essential that DRT scores be repeatable for a successful in-house program. In addition, it is desirable that in-house DRT scores be comparable to Dynastat scores. Results obtained over the first 12 months of the in-house program indicate that both repeatability and comparability have been achieved.

5.1 Listener Elimination

Normally a DRT is administered to 10 or 12 listeners. However, it is likely that one or two of them are trainees and one or two may not be performing up to their normal standard. Therefore a screening process is used to eliminate listeners from a given scoring run. The number of listeners is reduced to eight for each scoring run. This is the number that Dynastat uses. The elimination procedure used has been developed to improve the consistency of the listeners as a group by eliminating outliers. Let L = number of listeners and s = number of speakers for a particular DRT. Suppose X_{ij} is the ith listeners' DRT score for speaker j where $i = 1, \ldots, L$ and $j = 1, \ldots, S$. We compute the mean DRT score for each speaker j.

$$\overline{X} \cdot j = \frac{1}{L} \sum_{i=1}^{L} X_{ij}, j = 1, ..., s.$$

We then form a matrix whose elements D_{ij} are the differences between the ith listener's score for speaker j and the mean for speaker j. Thus,

$$D_{ij} = X_{ij} - \overline{X}^{*}j, i = 1,..., L; j = 1,..., s$$
.

Those listeners who are performing at or near the mean for all speakers will have differences that are near zero. Those that perform exceptionally low or high for one or more speakers might be considered outliers. A measure based on the magnitude of these differences is used to eliminate the listener who is an outlier. The measure is

$$VAR_i = \frac{1}{S} \sum_{i=1}^{8} D_{ij}^2, i = 1,..., L$$
.

The listener having the largest VAR_i is eliminated from the scoring run. L is then reduced by one and the process is repeated by computing new speaker means and differences. Again VAR_i is computed for each listener and the next listener is eliminated. This procedure is repeated until only eight listeners remain. This

process allows for the possibility of very high scoring listeners to be eliminated. However, it has been our experience that only rarely is a high scoring listener eliminated.

5.2 Repeatability and Comparability

Every listening session is started by administering the same three-speaker DRT. We refer to this DRT as the probe. The probe was also used during the training periods in December 1976 and January 1977. It consists of the first three speakers from Table 11. The scores obtained by each listener for the probe is closely tracked in order to monitor the listeners' consistency. The mean score for the probe each week provides us a measure of repeatability as well as a comparison with Dynastat scores. Additionally, from time to time a particular DRT is administered to the listening crew a second or third time in order to measure repeatability. Figure 10 is a scatter diagram of mean DRT scores for the probe for 40 repetitions. Each point represents one administration of the test. The first test was given on 14 January 1977 and the last on 22 December 1977. Each mean is based on only eight listener scores. Elimination of listeners was accomplished as described in Section 5.1. Also included in the figure is a conficence interval for the mean based on a Dynastat score of 86, 8 and standard error of 0,75 for these speakers. A rapid learning trend during the first four sessions is apparent in the figure. After that time the scores are rather consistent except for a drop after the 22nd repetition. This was a time when several new listeners were added to replace departing members of the crew. The low scores for repetition numbers 23, 29, and 35 can be explained by noting that a full listening crew was not available on those dates and trainees' scores are included in the mean. 95 percent confidence intervals for the mean DRT score in the range 88 to 90 are typically two to three points wide. Most of the scores reflected in Figure 10 are well within a three-point band. This indicates that the in-house listening crew performs consistently over time. In-house DRT scores are shown to be comparable with scores obtained by Dynastat in Table 14. Table 14 contains mean DRT scores and standard errors for those systems that have been tested at least three times using either in-house or Dynastat resources. A one-way classification analysis of variance was performed on the scores for each system. No significant differences were found. This indicates that in-house and Dynastat DRT scores for the same system are essentially the same. Thus, direct statistical comparisons can be made using a mix of in-house and Dynastat DRT results.

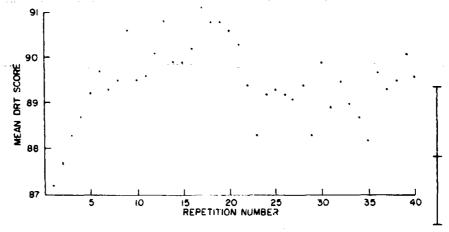


Figure 10. Mean DRT Scores for Probe After Eliminating Outlier Listeners

Table 14. In-House and Dynastat DRT Scores

SYSTEM 10	(MEAS	IN-HOUSE :/STANDARD E REPETITION	(PPOR)	DYNAS (MEAN/STAND REPEY)	ARD ERROR)							
	2	ž	3	1	2							
2001	91.9/0.46			90.6/0.62	90.4/0.65							
2012	87.5/0.46			85.0/0.93	65.9/0.\$1							
2025	91.3/0.44	91.5/6.43		89.6/0.74								
2043	92.2/0.48	92.6/0.41		90.9/0.28								
2047	87.7/0.63	88.4/0.58		67.1/0.56								
2048	79.8/0.59	81.4/0.56	78.9/0.74	81.5/0.85								
2049	70.5/0.90	71.9/0.85		72.3/0.95								
2050	90.6/0.40	91.3/0.35		91.7/0.37								
2051	85.2/0.63	86.7/0.54		86.0/0.38								
2052	76.7/0.76	77.5/0.71	75.5/0.90	77.2/0.70								
2051	68.8/3.86	68.3/c.80		69.1/1.29								
2058	81.2/1.61	81.5/1.43		83.5/0.80								
2060	81.0/1.17	79.3/1.49		82.6/0.65								
2069	88.6/0.52	89.7/0.55	89.7/0.42	88.7/0.30								
2070	84.7/0.72	86.2/0.73	,	87.6/0.57								
2071	69.2/1,12	69.3/1.21		71.4/0.96								
2072	66.5/1.81	70.2/1.74		72.8/0.59								
2073	84.7/0.60	85.3/0.63		84.5/0.73								

6. COST

The weekly costs to conduct in-house DRTs are summarized below:

Listener salaries 12 listeners, 4-1/2 hours at \$3.00 per hour	\$162.00
Test booklets 252 booklets at \$.11 each	27.72
Test Administrator Salary 5 hours at approximately \$8.00 per hour	40.00
Scoring Cost: Scorer salary (6 hours at \$3.00 per hour) \$18.00 Computer No Charge	18.00
Total cost for three six-speaker DRTs:	\$241.72
Cost for one six-speaker DRT: In-house \$82.85	

The above in-house cost does not include development and implementation of the in-house capability. These additional costs, if apportioned over a 3-year period, would add less than \$50.00 to the cost of a single six-speaker DRT. Overhead costs have not been included in the above figures. Allowing for as much as 100 percent for overhead results in a final in-house cost for a six-speaker DRT that is significantly lower than that charged by a contractor. Sufficient demand exists to utilize the entire in-house capability of 150 six-speaker DRTs each year, thus realizing a large cost savings.

7. CONCLUSIONS AND RECOMMENDATIONS

It is concluded that the in-house DRT capability is a cost-effective means of providing a needed measure of voice communications intelligibility. It provides reliable data that is based on a widely accepted measure of intelligibility that is fast becoming a DoD Standard. It has been shown that the in-house testing provides results that are equivalent to those provided by contractor resources at a large cost savings. The in-house capability provides the additional advantage of rapid turnaround time, thus allowing decisions to be made in a timely fashion. The reduced unit cost of in-house DRTs allows us to perform the large number of DRTs required for our on-going algorithm development. Contractor costs for the number of DRTs required would be prohibitive. In addition to substantial cost savings and speedy turn-around, it is essential for the Government to have an in-house mechanism for validating results that might otherwise only be available from one, or very few other sources. This is particularly important in view of the decisions based on these results. It is recommended that the in-house capability be maintained.

It is a valuable resource that has widespread application throughout the Department of Defense. This capability could be expanded to serve the needs of other agencies requiring intelligibility testing and thus realize its maximum potential benefit. It is further recommended that continued use of contractor resources be made for conducting DRTs so that independent, unbiased results can be obtained at key points in our investigations. This will further serve to verify in-house results and provide a periodic comparison between in-house and contractor DRT scores.

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Appendix A

Diagnostic Rnyme Test Word Lists

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PAGE	E 1 PAGE 2 PAGE 3		. 3	PAGE	. 4		
608 .	COOT	TEST	PAN	808	TOOT	PEST	FAN
DAUNT	BOND	PAULT	CHOCK	TAUNT	POND	VAULT	JOCK
ROOT	MOAN	NEHS	DOTE	HOOT	BONE	DUES	NOTE
CHEAT	81LL	VEE	THICK	SHEET	VILL	866	TICK
JAB	GUEST	THANK	CHAIR	GAB	JEST	SANK	CARE
TOT	FOUGHT	MAD	DONG	POT	THOUGHT	ROD	BONG
BOAST	POOP	SHOW	YOU	GHOST	COOP	80	RUE
LIP	LEAP	RID	REEK	RIP	REAP	LIO	FESK
SAID	VAST	DENSE	CALF	ZED	FAST	TENSE	GAFF
GNAH	KNOCK	8088	80MB	DAW	DOCK	HOSS	MOM
CHOOSE	DOZE	FOO	THOUGH	SHOES	THOSE	POOH	DOUGH
CHEEP	SING	THEE	GILT	KEEP	THING	ZEE	
DANK	NET	FAD	PENT	BANK	MET	THAD	JILT
DOT	TAUGHT	HOP	YAWL	GOT	CAUGHT	FOP	TENT
LOAD	RUDE	ROW	LOOT	ROAD	LEND		WALL
TINT	BEAN	GIN	FEEL	DINT	PEEN	LOW CHIN	ROOT
NECK	MAD	BEND	DAB	DECK	BAD		VEAL
THONG	VOX	CHAW	BON	TONG	BOX	MEND	NAB
CHOD	JOE	G003E	THOLE	000		SHAW	VON
WFED	810	TEAK	THIN	#EED	60	JUICE	SOLE
SAG	YEN	GAT	PEG		010	PEEK	FIN
ROT	RAW	LOCK	LONG	SHAG	HREN	BAT	KEG
ŸŎĹ€	SUE	COAT		LOT	LAW	ROCK	HRONG
NIP	NEED		DUNE	FOAL	200	GOAT	TUNE
PENCE	DAN	BIT	BEET	DIP	DEED	MIT	HEET
SAH	-	DEN	SHAD	PENCE	THAN	THEN	CHAD
	CHOP	GAUZE	GOT	THAW	COP	JAHS	JOT
POOL	THOR	NOON	BOWL	TOOL	FORE	MOON	DOLE
YIELD	FIT	TEA	GILL	HIELD	HTT	KEY	DILL
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WORD LIST

PAGE	1	PAGE 2		PAGF	PAGE 3		PAGE 4	
908	TOOT	PEST	FAN	608	COOT	TEST	PAN	
TAUNT	POND	VAULT	Jnck	DAUNT	BOND	PAULT	CHOCK	
9001	MOAN	NEWS	DOTE	MOOT	BONE	DUES	NOTE	
CHEAT	VILL	VEE	TICK	SHEET	BILL	BEC	THICK	
GAB	GUEST	SANK	CHATR	JAB	JEST	THANK	CARE	
101	THOUGHT	MAD	BONG	POT	FOUGHT	ROD	DONG	
BOAST	Chop	SHOW	RUE	GHOST	POOP	3 0	YOU	
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ZEO	FAST	TENSE	GAFF	SAID	VAST	DENSF	CALF	
GNAM	KNOCK	8055	Вомя	DAW	DUCK	M033	нон	
CHOOSE	THOSE	FNO	DOUGH	SHOES	DOZE	POOH	THOUGH	
KEEP	SING	ZEF	GILT	CHEEP	THING	THEE	JILT	
DANK	MET	FAD	TENT	BANK	NET	THAC	PENT	
DGT	CAUGHT	HOP	WALL	GOT	TAUGHT	FOP	YAWL	
LOAD	RUDE	Pnw	LOOT	ROAD	LFND	LOW	8001	
TINT	PEEN	GIN	VEAL	DINT	BEAN	CHIN	FEEL	
DECK	MAD	MEND	DAB	NECK	BAD	REND	NAB	
THONG	BOX	CHAM	VON	TONG	VOX	SHAN	BON	
CUD	JOE	JUICE	THOLE	CHUO	Gn	GOOSE	SHLE	
WEED	810	TEAK	THIN	HEFD	010	PEFK	FIN	
SAG	MREN	GAT	KFG	SHAG	YEN	BAT	PEG	
LOT	RAW	ROCK	LONG	POT	LAW	LOCK	HRONG	
VOLE	3 U E .	COAT	DUNE	FOAL	žno	GOAT	TUNE	
PIP	NEED	MIT	BEET	NIP	DEED	BIT	MEET	
PENCE	DAN	THEN	SHAD	FENCE	THAN	DEN	CHAD	
THAN	CHOP	JAHS	GOT	HAR	COP	GAUZE	JOT	
TOOL	FORE	MOON	DOLE	POOL	THOR	NOON	BOWL	
YIELD	HIT	TFA	DTLL	WIELD	FIT	KEY	GILL	
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808	CDOT	PEST	PAN	GOB	TOOT	TEST	FAN	
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CHEAT	VILL	VEE	TICK	SHEET	BILL	338	THICK	
GAR	GUEST	SANK	CHAIR	JAB	JEST	THANK	CARE	
POT	THOUGHT	ROD	BANG	TOT	FOUGHT	MAD	DONG	
BOAST	COOP	SHOW	RUE	OHOST	POOP	30	YOU	
RIP	LEAP	LID	REEK	LIP	REAP	RID	LEEK	
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DAW	KNOCK	MOSS	BOMB	GNAW	DOCK	8058	HOM	
SHOES	THOSE	POOH	DOUGH	CHOOSE	DOZE	F00	THOUGH	
KEEP	THING	ZEE	JILT	CHEEP	SING	THEE	GILT	
MANK	MET	FAD	TENT	BANK	NET	THAD	PENT	
GOT	CAUGHT	FOP	WALL	DOT	TAUGHT	HOP	YAWL	
RCAD	LEMO	FOM	ROOT	LDAD	RUDE	ROH	LOOT	
TINT	BEAN	GIN	PEEL	DINT	PEEN	CHIN	VEAL	
UECK	MAD	MEND	DAB	NECK	BAD	BEND	NAB	
TONG	BOX	SHAW	VON	THONG	VOX	CHAN	BON	
COO	JOE	JUICE	THOLE	CHOO	GO	GOOSE	BOLE	
WEED	DIO	TEAK	FTN	REED	BIC	PEEK	THIN	
SAG	YEN	GAT	PEG	SHAG	WREN	BAT	KEG	
LOT	RAW	RUCK	LONG	ROT	LAW	LOCK	HRONG	
FOAL	200	GOAT	THRE	VOLE	SUE	COAT	DUNE	
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THAW	COP	JANS	JOT	BAW	CHOP	GAUZE	GOT	
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608	COOT	TEST	PAN	808	1001	PEST	FAN
DAUNT	POND	PAULT	JOCK	TAUNT	BOND	VAULT	CHOCK
MODT	BONE	DUES	NOTE	BOOT	MOAN	NENS	DOTE
SHEET	VILL	BEE	TICK	CHEAT	BILL	VEE	THICK
SAB	JEST	BANK	CARE	JAB	GUEST	THANK	CHAIR
POT	FOUGHT	ROD	DONG	TOT	THOUGHT	WAD	BONG
BOAST	POOP	SHOW	YOU	GHOST	COOP	80	RUE
LIP	REAP	RID	LEEK	RIP	LEAP	LID	REEK
BAID	VAST	DENSE	CALP	200	FAST	TENSE	GAFF
DAH	DOCK	MO88	MOM	GNAW	KNOCK	6088	BOMB
SHOES	THOSE	PHOH	DOUGH	CHOOSE	DOZE	FOO	THOUGH
KEEP	BING	222	GILT	CHEEP	THING	THEE	JILT
BANK	MET	THAD	TENT	DANK	NET	FAD	PENT
SOT	TAUGHT	POP	YAWL	DOT	CAUGHT	HOP	WALL
LOAD	RUDE	ROH	LOOT	ROAD	LEND	LOW	ROOT
TINT	PEEN	GIN	VEAL	DINT	BEAN	CHIN	FEEL
DECK	MAD	MEND	DAB	NECK	BAD	BEND	NAB
THONG	VOX	CHAH	BON	TONG	BOX	SHAW	VON
C00	60	JUICE	SOLF	CHOO	JOE	GOOSE	THOLE
REED	BID	PEEK	THIN	WEED	DIO	TEAK	PIN
BHAG	WREN	BAT	KEG	RAG	YEN	GAT	PEG
LOT	RAW	*OCK	LONG	ROT	LAH	LOCK	WRONG
FOAL	SUE	LOAT	DUNE	VOLE	200	COAT	TUNE
NIP	DEED	BIT	HEET	OIP	NEED	MIT	BEET
FENCE	DAN	DEN	SHAD	PENCE	THAN	THEN	CHAD
THAM	CHOP	JANS	GOT	SAW	COP	GAUZE	JOT
POOL	FORE	NOON	DOLE	TOOL	THOR	MOON	BOWL
VIELD	HIT	TEA	DILL	WIELD	FIT	KEY	GILL
RAP	RFAT	LAMP	LEND	LAP	LEST	RAMP	REND

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F06	TOOT	PEST	FAN	ROB	COOT	TEST	PAN	
TAUNT	POND	VAULT	JOEK	DAUNT	BONO	PAULT	CHOCK	
8007	BONE	NEHS	NOTE	POOT	MOAN	DUES	DOTE	
CHEAT	VILL	VEE	TICK	SHEET	BILL	BEE	THICK	
GAB	GUEST	SANK	CHAIR	JAB	JE87	THANK	CARE	
POT	FOUGHT	ROD	DONG	707	THOUGHT	WAD	BONG	
BHOST	POOP	80	YOU	ROAST	COOP	SHOW	RUE	
LIP	REAP	RID	LEEK	RÌP	LEAP	LID	REEK	
ZED	FAST	TENSE	GAFF	SAID	VAST	DENSE	CALF	
BAH	DOCK	M088	MôH	GNAW	KNOCK	8033	8048	
CHOOSE	THOSE	F00	DOUGH	SHOES	DOZE	POOH	THOUGH	
KEEP	THING	ZEE	JILT	CHEEP	SING	THEE	GILT	
BANK	NET	THAD	PENT	DANK	MET	FAD	TENT	
GOT	CAUGHT	FOP	WALL	DOT	TAUGHT	HOP	YAWL	
ROAD	RUCE	LOW	LODT	LOAD	LEND	ROW	ROOT	
TINT	BEAN	GIN	FEEL	DINT	PEEN	CHIN	VEAL	
NECK	BAD	BEND	NAB	DECK	MAD	MENO	DAB	
TONG	VOX	SHAW	BON	THONG	BOX	CHAM	VON	
CHOD	JOE	GOOSE	THOLE	CON	60	JUICE	SOLE	
REED	010	PEEK	FIN	HEED	810	TEAK	THIN	
SAG	YEN	GAT	PEG	BHAG	HREN	BAT	KEG	
401	LAH	LOCK	WRONG	LOT	RAW	ROCK	LONG	
FOAL	Z00	GOAT	TUNE	VOLE	SUE	COAT	DUNE	
NIP	NEED	BIT	BEET	Ulb	OEED	HIT	MEET	
PENCE	THAN	DEN	CHAD	PENCE	DAN	THEN	SHAD	
THAN	COP	BWAL	JOT	MAR	CHOP	GAUZE	GOT	
TOOL	FORE	MOON	DOLE	POOL	THOR	HOON	BOWL	
YIELD	FIT	TEA	GILL	HIELD	HIT	KEY	DILL	
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TAUNT	BOND	VAULT	CHOCK	DAUNT	POND	FAULT	JOCK
BOOT	BONE	NEW8	NOTE	MODT	MOAN	DUES	DOTE
CHEAT	BILL	VEE	THICK	SHEET	VILL	BEE	TICK
JAB	JEST	THANK	CARE	GAR	GUEST	BANK	CHAIR
POT	FOUGHT	ROD	DONG	TOT	THOUGHT	WAD	BONS
BOAST	POOP	SHON	YOU	GHOST	COOP	80	RUE
RIP	REAP	LID	LEEX	LIP	LEAP	RID	reek
SAID	VAST	DENSE	CALF	ZED	PAST	TENSE	BAFF
GNAW	DOCK	B083	MOM	DAW	KNOCK	M038	BOMB
CHOOSE	DOZE	FOO	THOUGH	SHOES	THOSE	POOH	DOUGH
KEEP	THING	ZEE	JILT	CHEEP	SING	THEE	BILT
BANK	NET	THAD	PENT	DANK	MET	FAD	TENT
GOT	TAUGHT	FOP	YAWL	DOT	CAUGHT	HOP	WALL
ROAD	RUDZ	LOW	LOOT	LOAD	LEHD	ROM	ROOT
TINT	PEEN	GIN	VEAL.	DINT	BEAN	CHIN	FEEL
NECK	BAD	BEND	NAB	DECK	MAD	MEND	DAB
THONG	BOX	CHAH	VON	TONG	VOX	SMAH	80N
E00	GO	JUICE	SOLE	CHOO	JOE	00036	THOLE
WEED	810	TEAK	THIN	REED	DID	PEEK	FIN
BAG	YEN	GAT	PEG	SHAG	WREN	BAT	KEG
LOT	LAH	ROCK	WRONG	POT	RAW	FOCK	LONG
FOAL	200	GOAT	TUNE	VOLE	SUE	COAT	DUNE
NIP	NEED	BIT	BEET	DIP	DEED	MIT	MEET
PENCE	DAN	THEN	SHAD	FENCE	THAN	DEN	CHAD
THAW	COP	JAHS	JOT	SAW	CHOP	GAUZE	GOT
POOL	THOR	NOON	BOWL	TOOL	FORE	NCOM	DOLE
VIELD	FIT	TEA	GİLL	WIELD	HIT	KEY	DILL
BID	REST	LAMP	LEND	LAP	LEST	RAKP	REND

WORD LIST

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608	1001	TEST	FAN	808	COOT	PEST	PAN
TAUNT	POND	VAULT	JOCK	DAUNT	BOND	FAULT	CHOCK
HOOT	MDAN	DUES	DOTE	BOOT	BONE	NENS	NOTE
CHEAT	BILL	VEE	THICK	SHEET	VILL	330	TICK
GAB	GUEST	SANK	CHAIR	JAB	JEST	THANK	CARE
TOT	FOUGHT	WAD	DONG	POT	THOUGHT	ROD	BONG
BOAST	POOP	SHOW	YOU	GHOST	COOP	80	RUE
LIP	LEAP	RID	REEK	RIP	REAP	LID	LEEK
BAID	VAST	DENSE	CALF	760	PAST	TENSE	GAFF
GNAH	DOCK	8088	HOH	DAW	KNOCK	MO88	BOMB
SHOES	THOSE	POOH	DOUGH	CHOOSE	DOZE	F00	THOUGH
CHEEP	SING	THEE	GILT	KEEP	THING	255	JILT
DANK	MET	FAD	TENT	BANK	NET	THAD	PENT
007	CAUGHT	HOP	WALL	GOT	TAUGHT	FOP	YAWL
ROAD	RUDE	LOW	LOOP	LOAD	LEND	ROW	ROOT
DINT	PEEN	CHIN	VEAL	TINT	BEAN	GIN	PEEL
NECK	BAD	BEND	NAB	DECK	MAD	MEND	DAB
THONG	VOX	CHAM	BON	TONG	BOX	SHAH	VON
E00	60	JUICE	SOLE	CHOO	JOE	GODSE	THOLE
HEED	010	TEAK	PIN	REED	810	PEEK	THIN
BAG	YEN	GAT	PEG	SHAG	WREN	BAT	KEG
ROT	LAW	LOCK	HRONG	LOT	RAW	ROCK	LONG
VOLE	200	COAT	TUNE	FOAL	SUE	COAT	DUNE
DIP	NEED	HIT	BEET	NIP	DEED	BIT	MEET
PENCE	THAN	DEN	CHAD	PENCE	DAN	THEN	SHAD
THAN	CHOP	JAHS	GOT	SAW	COP	BAUZE	JOT
POOL	FORE	NOON	DOLE	TOOL	THOR	MOON	BOWL
WIELD	HIT	KEY	DILL	YIELD	PIT	TEA	GILL
HIELD		RAMP	REND	RAP	REST	LAMP	LEND

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608	COOT	TEST	PAN	ROB	T007	PEST	FAN
TAUNT	BOND	VAULT	CHOCK	DAUNT	POND	PAULT	JOCK
8007	BONE	NEWS	NOTE	HOOT	MOAN	DUES	DOTE
CHEAT	BILL	VEE	THICK	SHEET	VILL	BEE	TICK
JAB	₽U#ST	THANK	CHATR	GAB	JEST	SANK	CARE
POT	THEGONT	₽ OD	BONG	TOT	POUGHT	WAD	DONG
BOAST	COOP	SHOW	RUE	GHOST	POOP	80	YOU
LIP		RID	LEEK	RIP	LEAP	LID	REEK
BAID	VAST	DENSE	CALP	ZED	FABT	TENSE	GAFF
GNAH	DOCK	8088	MOM	DAW	KNOCK	MDSS	BOMB
SHOES	THOSE	PODH	DOUGH	CHOOSE	DOZE	F00	THOUGH
KEEP	THING	ZEE	JILT	CHEEP	SING	THEE	GILT
BANK	HET	THAD	TENT	DANK	NET	FAD	PENT
DOT	CAUGHT	HOP	WALL	GOT	TAUGHT	FOP	YAWL
LOAD	LEND	ROW	ROOT	ROAD	RUDE	LOW	LOOT
TINT	BEAN	GIN	PEEL	DINT	PEEN	CHIN	VEAL
NECK	MAD	BEND	DAB	DECK	BAD	MEND	NAB
THONG	VOX	CHAH	BON	TONG	BOX	SHAW	VON
000	90	JUICE	SOLE	CHOD	JOE	GOOSE	THOLE
WEED	DID	TEAK	FIN	REED	810	PEEK	THIN
SAG	WREN	GAT	KEG	SHAG	YEN	BAT	PEG
LOT	LAW	POCK	WRONG	ROT	RAW	FOCK	
POAL	SUE	GOAT	DUNE	VOLE	200	COAT	LONG
NIP	NEED	BIT	BEET	DIP	DEED		TUNE
PENCE	THAN	DEN	CHAD	PENCE	DAN	MIT	MEET
THAN	COP	JAHS	JOT	SAW	-	THEN	SHAD
TOOL	THOR	NOCH			CHOP	GAUZE	GOT
WIELD	FIT	KEA	BOML	POOL	FORE	NOON	DOLE
			GILL	AIEFD	HIT	TEA	DILL
LAP	LEST	RAMP	REND	RAP	REST	LAMP	LEND

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808	TOOT	PEST	FAN	GOÐ	COOT	TEST	PAN	
TAUNT	BOND	VAULT	CHOCK	DAUNT	POND	FAULT	JOEK	
8007	BONE	NEHS	NOTE	MOOT	MOAN	DUES	DOTE	
SHEET	BILL	338	THICK	CHEAT	VILL	VEE	TICK	
GAB	JEST	SANK	CARE	JAB	GUEST	THANK	CHAIR	
POT	THOUGHT	ROD	BONG	TOT	FOUGHT	WAD	DONE	
BH087	COOP	80	RUE	BOAST	POOP	SHOW	YOU	
RIP	REAP	LID	LEEK	LIP	LEAP	RID	REEK	
BATD	VAST	DENSE	CALF	ZED	PAST	TENBE	BAPP	
DAN	DOCK	M088	HOH	GNAW	KNOCK	8088	BOMB	
CHOOSE	THOSE	FOO	DOUGH	84028	DOZE	POOM	THOUGH	
KEEP	THING	255	JILT	CHEEP	SING	THEE	SILT	
DANK	NET	PAD	PENT	BANK	MET	THAD	TENT	
001	CAUGHT	HOP	WALL	GOT	TAUBHT	POP	YAML	
ROAD	RUDE	LOW	LOOT	LOAD	LEND	ROW	ROOT	
TINT	BEAN	GIN	PEEL	DINT	PEEN	CHIN	VEAL	
DECK	MAD	MEND	DAB	NECK	BAD	BEND	NAB	
TONG	VOX	SHAH	BON	THONG	BOX	CHAW	VON	
CHOO	GO	GONSE	SOLE	CO0	JOE	JUICE	THOLE	
WEED	810	TEAK	THIN	REED	010	PERK	PIN	
SHAG	HREN	BAT	KEG	845	YEN	GAT	PEG	
LOT	RAW	ROCK	LONG	ROT	LAW	LOCK	WRONG	
VOLE	200	COAT	TUNE	FOAL	SUE	SOAT	DUNE	
DIP	NEED	HIT	BEET	NIP	DEED	BIT	MEET	
PENCE	THAN	DEN	CHAD	PENCE	DAN	THEN	SHAD	
BAW	CHOP	GAUZE	GOT	THAN	COP	JAME	JOT	
POOL	THOR	NOON	BOWL	TOOL	FORE	HOON	DOLE	
WIELD	HIT	KEY	DILL	YIELD	FIT	TEA	GILL	
RAP	LEST	LAMP	REND	LAP	REST	RAMP	LEND	

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TAUNT	BOND	VAULT	CHOCK	DAUNT	POND	FAULT	JOCK
MOOT	BONE	DUES	NOTE	8001	HOAN	NEWS	DOTE
SHEET	BILL	338	THICK	CHEAT	VILL	VEE	TICK
GAB	BUEST	BANK	CHAIR	JAR	JEST	THANK	CARE
TOT	POUGHT	HAD	DONG	POT	THOUGHT	ROD	BONG
SHOST	COOP	80	RUE	BOART	POOP	SHOW	AON
LIP	REAP	RID	LEEK	RIP	LEAP	LID	REEK
ZED	FAST	TENSE	GAFF	SAID	VAST	DENSE	CALF
BNAH	KNOCK	8088	80M8	DAH	DOCK	HOSS	MOM
CHODSE	THOSE	FOO	DOUGH	SHOES	DOZE	PODH	THOUGH
CHEEP	THING	THEE	JILT	KEEP	SING	255	GILT
BANK	MET	THAD	TENT	DANK	NET	FAD	PENT
004	TAUGHT	HOP	YAML	601	CAUGHT	FOP	WALL
ROAD	RUDE	LOW	LOOT	LOAD	LEND	ROW	ROOT
DINT	PEEN	CHIN	VEAL	TINT	BEAN	GIN	FEEL
NECK	BAD	BEND	NAB	DECK	MAD	MEND	DAU
THONG	VOX	CHAH	BON	TONG	BOX	SHAW	VON
CHOO	60	GOOSE	SOLE	C00	JOE	JUICE	THOLE
REED	DID	PEEK	PIN	WEED	810	TEAK	THIN
SHAG	HREN	BAT	KEG	SAG	YEN	GAT	PEG
ROT	LAW	LOCK	WRONG	LOT	RAH	ROCK	LONG
VOL 2	Z00	COAT	TUNE	FOAL	\$UE	GOAT	DUNE
NIP	DEED	BIT	MEET	DIP	NEED	HIT	BEET
PENCE	DAN	THEN	SHAD	PENCE	THAN	DEN	CHAD
SAH	CHOP	GAUZE	GOT	THAM	COP	JAWS	JOT
TOOL	PORE	MOON	DOLE	POOL	THOR	NODN	BOWL
WIELD	FIT	KEY	GILL	YIELD	HIT	TEA	DILL
RAP	REST	LAMP	LEND	i AĐ		DAMO	DIEC

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808	CDOT	PEST	PAN	808	TOOT	TEST	FAN
DAUNT	BOND	FAULT	CHOCK	TAUNT	POND	VAULT	JOCK
8007	BONE	NEWS	NOTE	MODT	MOAN	DUES	DOTE
SHEET	VILL	338	TICK	CHEAT	BILL	VEE	THICK
GAB	GUEST	SANK	CHAIR	JAR	JEST	THANK	CARE
TOT	POUGHT	WAD	DONG	POT	THOUGHT	ROD	BONG
GHOST	POOP	80	YOU	BOAST	COOP	SHOW	RUE
RIP	REAP	LID	LEEK	LIP	LEAP	RID	REEK
SAID	VAST	DENSE	CALF	250	FAST	TENSE	GAPP
GNAH	DOCK	8083	MOM	DAW	KNOCK	MOSS	BOMB
SHOES	THOSE	POOH	DOUGH	CHOOSE	DOZE	P00	THOUGH
KERP	BING	ZEE	GILT	CHEEP	THING	THEE	JILT
BANK	NET	THAD	PENT	DANK	MET	FAD	TENT
COT	CAUGHT	HOP	WALL	GOT	TAUGHT	POP	YAWL
LOAD	RUDE	ROW	LOOT	ROAD	LEND	LOW	ROOT
TINT	BEAN	GIN	FEEL	DINT	PEEN	CHIN	VEAL
NECK	MAD	BEND	DAB	DECK	BAD	MEND	NAB
TONG	BOX	SHAW	VON	THONG	VOX	CHAH	BON
000	60	JUICE	SOLE	CHOO	JOE	60036	THOLE
REED	DID	PEEK	FIN	HEED	810	TEAK	THIN
SAG	WREN	GAT	KEG	SHAG	YEN	BAT	PEG
LOT	RAW	POCK	LONG	ROT	LAH	LOCK	HRONG
FOAL	Z00	GOAT	TUNE	VOLE	8u€	COAT	DUNE
DIP	DEED	MIT	MEET	NIP	NEED	BIT	BEET
PENCE	THAN	DEN	CHAD	PENCE	DAN	THEN	SHAD
THAN	CHOP	JAWS	GOT	SAW	COP	BAUZE	JOT
TOOL	THOR	MOON	BONL	POOL	FORE	NOON	DOLE
YIELD	PIT	TEA	OILL	WIELD	HIT	KEY	DILL
RAP	REST	LAMP	LEND	LAP	LEST	RAMP	REND

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808	T001	PEST	FAN	808	0000		
DAUNT	POND	PAULT	JOCK	TAUNT	COOT	TEST	PAN
HOOT	BONE	DUES	NOTE		80ND	VAULT	CHOCK
SHEET	VILL	BEE	TICK	BOOT Cheat	MOAN	NEHB	DOTE
GAB	JEST	BANK	CARE		BILL	YEE	THICK
TOT	POUGHT	HAD	DONG	JAB	GUEST	THANK	CHAIR
BOAST	POOP	SHOW	70U	POT	THOUGHT	ROD	BONG
LIP	REAP	RID		GHOST	COOP	80	RUZ
SAID	FAST	DENSE	LEEK	RIP	LEAP	LID	REEK
GNAH	DOCK	8088	BAPP	ZED	VAST	TENSE	CALF
34028	DOZE		MOM	DAW	KNOCK	HOSS	BOMB
CHEEP	SING	POOH Thee	THOUGH	CHOOSE	THOSE	700	DOUGH
BANK	NET		GILT	KEEP	THING	266	JILT
DOT	TAUGHT	THAD	PENT	DANK	MET	PAD	TENT
LOAD	LEND	HOP	AVAL	607	CAUSHT	FOP	WALL
TINT	PEEN	ROW	ROOT	ROAD	RUDE	LOW	LOOT
NECK		GIN	VEAL	DINT	BEAN	CHIN	FEEL
THONG	MAD	BEND	DAB	DECK	BAD	HEND	NAB
-	AOX	CHAN	BON	TONG	BOX	SHAH	YON
COO	60	JUICE	SOLE	CHDO	JOE	G0032	THOLE
REED	BIO	PEEK	THIN	WEED	DID	TEAK	FIN
SHAG	HREN	BAT	KEG	846	YEN	BAT	PEB
LOT	LAM	BOCK	wf ong	POT	RAW	LOCK	LONB
POAL	100	GOAT	TUNE	VOLE	BUE	COAT	DUNE
DIP	NEED	MIT	BEET	NIP	DEED	817	HEET
PENCE	THAN	DEN	CHAD	PENCE	DAN	THEN	SHAD
THAN	COP	BWAL	JOT	BAH	CHOP	BAUZE	801
TOOL	THOR	MODN	BOWL	POOL	FORE	NOON	DOLE
HIELD	PIŢ	KEY	GILL	YIELD	HIT	TEA	DULE
LAP	REST	RAMP	LEND	RAP	LEST	LAMP	DILL

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DAUNT	BOND	PAULT	CHOCK	TAUNT	POND	VAULT	JOCK
8007	BONE	NEW 8	NOTE	HOOT	MOAN	DUES	DOTE
CHEAT	BILL	VEE	THICK	SMEET	VILL	938	TICK
JAB	SUEST	THANK	CHAIR	GAR	JEST	SANK	CARE
POT	FOURHT	ROD	DONG	TOT	THOUGHT	WAD	BONS
GHOST	COOP	80	RUE	BOAST	POOP	SHOW	400
RIP	LEAP	LID	REEK	LIP	REAP	RIO	LEEK
BAID	VAST	DENSE	CALF	ZED	FAST	TENBE	GAFF
DAW	KNOCK	H088	BOMB	GNAW	DOCK	8088	MOM
SHOES	DOZE	POOH	THOUGH	CHOOSE	THOSE	POO	DOUGH
CHEEP	SING	THEE	BILT	KEEP	THING	ZEE	JILT
DANK	NET	FAD	PENT	BANK	MET	THAD	TENT
DOT	TAUBHT	HOP	YAWL	607	CAUGHT	FOP	WALL
LOAD	FEMO	ROW	ROOT	ROAD	RUDE	LOW	LOOT
DINT	BEAN	CHIN	PEEL	TINT	PEEN	GIN	VEAL
NECK	BAD	BEND	NAB	DECK	MAD	MEND	DAB
TONG	BOX	SHAW	VON	THONG	VOX	CHAM	BON
600	60	JUICE	SOLE	CHOO	JOE	GOOSE	THOLE
REED	810	PEEK	THIN	WEED	010	TEAK	FIN
846	HREN	GAT	KEG	BHAG	YEN	BAT	PEO
ROT	RAW	LOCK	LONG	LOT	LAN	ROCK	WRONG
VOLE	8uE	COAT	DUNE	FOAL	ino	COAT	TUNE
DIP	NEED	MIT	BEET	NIP	DEED	BIT	MEET
PENCE	THAN	DEN	CHAD	PENCE	DAN	THEN	SHAD
SAW	COP	GAUZE	J01	THAN	CHOP	SWAL	GOT
TOOL	THOR	HOON	BOWL	POOL	FORE	NOON	DOLE
WIELD	HIT	KEY	DILL	YIELD	FIT	TEA	BILL
RAP	REST	LAMP	LEND	LAP	LEST	RAMP	REND

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808	COOT	PEST	PAN	GOR	TOOT	TEST	FAN
TAUNT	POND	VAULT	JOCK	DAUNT	BOND	PÄULT	CHOCK
HOOT	BONE	DUES	NOTE	BOOT	MOAN	NEWS	DOTE
SHEET	BILL	936	THICK	CHEAT	VIL.	VEE	TICK
GAB	GUEST	BANK	CHAIR	JAR	JEST	THANK	CARE
TOT	THOUGHT	WAD	BONG	POT	POUGHT	ROD	DONG
BOAST	POOP	SHOW	YOU	GHDST	COOP	80	RUE
-LIP	LEAP	RID	REEK	RIP	REAP	LID	LEEK
ZED	FAST	TENSE	GAFF	SAID	VAST	DENSE	CALP
GNAH	KNOCK	5088	60M8	DAW	DOCK	H038	NOM
CHOOSE	DOZE	F00	THOUGH	SHDES	THOSE	POOH	DOUGH
KEEP	THING	266	JILT	CHEEP	SING	THEE	GILT
DANK	HET	FAD	TENT	BANK	NET	THAD	PENT
GOT	CAUGHT	FOP	WALL	DOT	TAUGHT	HOP	YAWL
LOAD	LEND	ROW	ROOT	ROAD	RUDE	I.OW	LOOT
DINT	PEEN	CHIN	VEAL	TINT	BEAN	GIN	FEEL
DECK	SAD	MEND	NAB	NECK	MAD	BEND	DAS
THONG	80×	CHAH	VON	TONG	VOX	SHAW	BON
COO	60	JUICE	SOLE	CHOO	JÖE	6008E	THOLE
WEED	810	TEAK	THIN	REED	010	PEEK	PIN
SHAG	YEN	BAT	PFG	SAG	WREN	GAT	KEG
ROT	RAW	LOCK	LONG	LOT	LAW	ROCK	WRONG
VOLE	\$U.	COAT	DUNE	FOAL	200	GOAT	TUNE
NIP	DEED	BIT	MEET	DIP	NEED	HIT	BEET
PENCE	THAN	DEN	CHAD	PENCE	DAN	THEN	SHAD
THAN	CHOP	JAHS	GOT	BAH	COP	GAUSE	JOT
TOOL	THOR	MOON	BOWL	POOL	FORE	NOON	DOLE
WIELD	HIT	MEY	DILL	YIELD	FIT	TEA	BILL
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DAUNT	BOND	PAULT	CHOCK	TAUNT	POND	VAULT	JOCK
ROOT	BONE	NEHS	NOTE	MODT	MOAN	DUES	DOTE
CHEAT	VILL	VEE	TICK	SHEET	BILL	BEE	THICK
GAR	GUEST	BANK	CHAIR	JAB	JEST	THANK	CARE
POT	FOUGHT	ROD	DONG	TOT	THOUGHT	WAD	BONG
GHOST	COOP	80	RUE	TRADE	POOP	SHON	YOU
LIP	LEAP	RID	REEK	RIP	REAP	LIO	LEEK
SAID	TBAV	DENSE	CALF	ZED	FAST	TENSE	GAFF
GNAH	KNOCK	8088	BOMB	DAW	DOCK	HOSE	MOM
CHOOSE	THOSE	FOR	DOUGH	SHOES	DOZE	POOH	THOUGH
CHEEP	SING	THEE	GILT	KEEP	THING	ZEF	JILT
DANK	NET	FAD	PENT	BANK	HET	THAD	TENT
DOT	TAUGHT	HOP	YANL	SOT	CAUGHT	FOP	WALL
LOAD	LEWD	ROW	ROOT	ROAD	RUDE	LOW	LOOT
DINT	PEEN	CHIN	VEAL	TINT	BEAN	BIN	PEEL
NECK	BAD	BEND	NAB	DECK	MAD	HEND	DAB
THONG	VOX	CHAN	BON	TONG	BOX	SHAW	VON
000	JOE	JUICE	THOLE	CHOO	60	BOOSE	BOLE
REED	810	PEEK	THIN	WEED	010	TEAK	PIN
SHAG	YEN	BAT	PEG	BAG	WREN	GAT	KEG
ROT	LAW	LOCK	HRONG	LOT	RAW	ROCK	LONG
VOLE	BUE	COAT	DUNE	FOAL	200	GDAT	TUNE
OIP	NEED	MIT	BEET	NIP	DEED	BIT	MEET
PENCE	THAN	THEN	CHAD	PENCE	DAN	DEN	SHAD
THAN	COP	JAHS	JOT	BAW	CHOP	GAUZE	GOT
POOL	FORE	NOON	DOLE	TOOL	THOR	MOON	BONL
HIELD	FIT	KEY	GILL	YIELD	HIT	TEA	DILL
RAP	REST	LAMP	LEND	LAP	LEST	RAMP	REND

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DAUNT	POND	FAULT	JOCK	TAUNT	BOND	VAULT	CHOCK
HOOT	MDAN	DUES	DOTE	B007	BONE	NEWS	NOTE
BHEET	VILL	BEE	TICK	CHEAT	BILL	VEE	THICK
GAB	GUESI	SANK	CHAIR	JAB	JEST	TMANK	CARE
TOT	FOUGHT	WAD	DONG	POT	THOUGHT	ROD	BUNG
GHOST	COOP	80	RUE	BOAST	POOP	SHOW	YOU
LIP	LEAP	RID	REEK	RIP	REAP	LID	LEEK
ZED	VAST	TENSE	CALP	BAID	FAST	DENSE	BAPP
DAW	KNOCK	HOSS	8048	GNAW	DOCK	8088	MCH
CHOOSE	DOZE	F00	THOUGH	SHOES	THOSE	POOH	DOUGH
KEEP	THING	266	JILT	CHEEP	BING	THEE	GILT
BANK	HET	THAD	TENT	DANK	NET	PAD	PENT
DOT	TAUSHT	HOP	YAML	607	CAUGHT	FOP	MALL
ROAD	LEND	LOW	ROOT	LOAD	RUDE	ROW	LOCT
DINT	PEEN	CHIN	VEAL	TINT	保を人と	GIN	FEEL
NECK	MAD	BEND	DAB	DECK	GAD	MEND	NAG
THONG	VOX	CHAN	BON	TOHE	864	SHAW	VON
CHOO	90	GODSE	SOLE	COS	:01	JUICE	THOLE
MEED	BID	TEAK	THÍN	#8 2 0	DIC	PEEK	FIN
SHAG	HREN	BAT	KEG	346	YE13	GAT	PRG
ROT	LAW	LOCK	HRONG	CBY	274	ROCK	LONG
VOLE	200	COAT	TUNE	FOAL	200	GOAT	DUNZ
NIP	NEED	817	BEET	OIP	DEED	MIT	MEET
PENCE	THAN	DEN	CHAD	PENCE	DAN	THEN	SHAD
SAW	COP	GAUZE	JOT	THAN	CHOP	JAWS	GOT
POOL	THOR	NOON	BOWL	TOOL	FORE	HOON	DOLE
HIELD	FIT	KEY	CILL	YIELD	HIT	TEA	DYLL
LAP	REST	RAMP	LEND	RAP	LEST	LAHP	REND

DIAGNOSTIC RIVER TEST

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	COOT	TEST	PAN	808	TOOT	PEST	FAN
808	•	VAULT	CHOCK	DAUNT	POND	PAULT	JOCK
TAUNT	BOND	_	DOTE	MOOT	BONE	DUES	NOTE
8001	MBAN	NEWS VEE	TICK	SHEET	BILL	BEE	THICK
CHEAT	VILL		CHAIR	JAB	JEST	THANK	CARE
GAB	GUESY	SANK		707	THOUGHT	WAD	BONG
POT	FOUGHT	ROD	DONG	GHOST	COOP	80	RUE
BOAST	POOP	SHOH	YOU	RIP	LEAP	LID	REEK
LIP	REAP	RID	LEEK	_	VABT	DENSE	CALP
ZED	FLBT	TENSE	GAPP	BAID	KNOCK	0088	BOMB
DAH	DOCK	HOSS	нон	GNAW		700	THOUGH
SHOES	THOSE	POOH	DOUGH	CHOOSE	DOZE	766 766	JILT
CHEEP	SING	THEE	GILT	KEEP	THING		TENT
DANK	NET	FAD	PENT	RANK	MET	THAD	
GDT	TAUGHT	FOP	YAWL	DOT	CAUGHT	HOP	HALL
RDAD	LEND	LOM	ROOT	LOAD	RUDE	ROW	L007
TINT	BEAN	GIN	PEEL	DINT	PEEN	CHIN	VEAL
DECK	MAD	MEND	DAB	NECK	BAO	BEND	NAB
TONG	BOX	SHAW	VON	THONG	VOX	CHAH	BON
CHOO	6 0	GOOSE	BOLE	COO	JOE	JUICE	THOLE
WEED	810	TEAK	THIN	PEED	DID	PEEK	FIN
SHAG	YEN	BAT	PEG	846	HREN	GAT	KEG
ROT	LAW	LOCK	WRONG	LOT	RAW	ROCK	FONG
VOLE	SUE	COAT	DUNE	FOAL	700	GOAT	TUNE
NIP	DEED	BIT	MEET	DIP	HEED	HIT	BEET
PENCE	THAN	DEN	CHAD	PENCE	DAN	THEN	BHAD
THAH	COP	JAHS	JOT	SAM	CHOP	GAUZE	GOT
TOOL	THOR	HOON	BOWL.	POOL	FORE	NOON	DOLE
WIELD	HIT	KEY	DILL	VIELD	FIT	TEA	GILL
# 1 E L 1)	BFAT	LAMP	LEND	LAP	LEST	RAMP	REND

PAGE	1 1	PAGE	. 2	PAGE	3	PAGE	4
608	1001	TEST	PAN	808	COOT	PEST	PAN
DAUNT	BOND	PAULY	CHOCK	TAUNT	POND	VAULT	JOCK
MOOT	BONE	DUES	NOTE	8001	MOAN	HENS	DOTE
CHEAT	BILL	VEE	THICK	SHEET	VILL	920	TICK
GAB	SUEST	BANK	CHAIR	JAB	JEST	THANK	CARE
TOT	POUGHT	HAD	DONG	POT	THOUGHT	ROD	BONG
BOAST	POOP	SHOW	YOU	GHOST	C00P	80	RUE
RIP	LEAP	LID	REEK	LIP	REAP	RID	LEEK
SAID	VAST	DENSE	CALF	ZED	PAST	TENBE	GAFF
GNAW	DOCK	8088	мом	DAW	KNOCK	HOSS	BOMB
SHOES	DOZE	POOH	THOUGH	CHOOSE	THOSE	F00	DOUGH
KEEP	THING	ZEE	JILT	CHEEP	SING	THEE	GILT
DANK	HET	FAD	TENT	BANK	NET	THAD	PENT
607	TAUSHT	FOP	YAWL	DOT	CAUGHT	HOP	WALL
ROAD	LEHD	LOW	ROOT	LOAD	RUDE	ROW	LOOT
TINT	PEEN	GIN	VEAL	DINT	BEAN	CHIN	FEEL
DECK	BAD	MEND	NAB	NECK	MAD	BEND	DAB
THONG	VOX	CHAM	BON	TONG	BOX	SHAW	VON
CHOD	GÖ	GOOSE	SOLE	con	JOE	JUICE	THOLE
REED	DID	PEEK	FIN	WEED	018	TEAK	THIN
SAG	HREN	GAT	KEG	SHAG	YEN	BAT	PEG
ROT	RAH	LOCK	LONG	LOT	LAH	ROCK	WRONG
VOLE	200	COAT	TUNE	POAL	\$u€	BOAT	DUNE
OIP	NEED	MIT	BEET	NIP	DEED	BIT	HEET
PENCE	THAN	DEN	CHAD	PENCE	DAN	THEN	SHAD
THAW	COP	JANS	JOT	SAW	CHOP	GAUZE	GOT
POOL	FORE	NOON	DOLE	TOOL	THOR	MOON	BOHL
YIELD	FIT	TEA	GILL	HIELD	H17	KEY	DILL
RAP	REST	LAMP	LEND	LAP	LEST	RAMP	REND

PAGE	1.1	PAGE 2		PAGE	3	PAGE 4	
808	1007	PEST	FAN	GOB	COOT	TEST	PAN
BAUNT	POND	FAULT	JOCK	TAUNT	BOND	VAULT	CHOCK
8007	BONE	NEWS	NOTE	HOOT	MOAN	DUES	DOTE
CHEAT	BILL	VEE	THICK	SHEET	VILL	BEE	TICK
JAB	GUEST	THANK	CHAIR	BAR	JEST	SANK	CARE
POT	THOUGHT	ROD	BONG	TOT	FOUGHT	WAD	DONS
BOAST	POOP	SHOW	YOU	GHDST	COOP	30	RUE
LIP	LEAP	RID	REEK	RIP	REAP	LID	LEEK
SAID	FAST	DENSE	BAFF	ZED	VAST	TENSE	CALF
DAW	KNOCK	MOSS	BOMB	GNAW	DOCK	8088	HOH
SHOES	DOZE	POOH	THOUGH	CHOOSE	THOSE	1:00	DOUGH
KEZP	SING	ZEE	BILT	CHEEP	THING	THEE	JILT
DANK	MET	PAR	TENT	BANK	NET	THAD	PENT
GOT	CAUGHT	FOP	MALL	DOT	TAUGHT	HOP	YAHL
ROAD	LEND	LOW	ROOT	LOAD	RUDE	ROW	LOOT
DINT	BEAN	CHIN	PEEL	TINT	PEEN	BIN	VZAL
DECK	MAD	HEND	DAB	NECK	BAD	BEND	NAB
TONG	BOX	SHAW	VON	THONG	VOX	CHAM	BON
COO	JOE	JUICE	THOLE	CHOO	60	GOOSE	BOLE
REED	DID	PEEK	FIN	HEED	810	TEAK	THIN
SHAG	HREN	BAT	KEG	SAG	YEN	GAT	PEG
ROT	RAW	FOCK	LONG	LOT	LAW	ROCK	WRONG
VOLE	200	COAT	TUNE	FOAL	SUE	GOAT	DUNE
DIP	DEED	MIT	HEET	NIP	NEED	BIT	BEET
PENCE	THAN	DEN	CHAD	PENCE	DAN	THEN	SHAD
THAN	CHOP	JAWS	GOT	BAW	COP	GAUZE	JOT
POOL	FORE	NOON	DOLE	TOOL	THOR	MOON	BONL
MIELO	HIT	KEY	DILL	YIELD	FIT	TEA	GILL
RAP	REST	LAMP	LEND	LAP	LEST	RAMP	REND

PAGE	1	PAGE 2		PAGE	3	PAGE 4	
808	COOT	PEST	PAN	608	T00T	TEST	FAN
DAUNT	POND	PAULT	JOCK	TAUNT	BOND	VAULT	CHOCK
BOOT	HOAN	NEHB	DOTE	HOOT	BONE	DUES	NOTE
CHEAT	BILL	VEE	THICK	SHEET	VĪLL	922	TICK
JAB	JEST	THANK	CARE	BAB	SUEST	BANK	CHAIR
TOT	FOURHT	WAD	DONE	POT	THOUGHT	ROD	BONS
BOAST	COOP	SHOW	RUE	SHOST	POOP	80	YOU
RIP	REAP	LID	LEEK	LIP	LEAP	RID	REEK
BAID	FAST	DENSE	GAFF	ZED	VAST	TENSE	CALF
DAW	DOCK	MOBS	HOM	GNAW	KNOCK	8088	90M8
SH0E8	DOZE	POOH	THOUGH	CHOOSE	THOSE	P00	DOUGH
CHEEP	SING	THEE	SILT	KEEP	THING	222	JILT
DANK	NET	FAD	PENT	BANK	MET	THAD	TENT
DOT	TAUGHT	HOP	YAWL	GOT	CAUBHT	FOP	WALL
LOAD	RUDE	ROM	LOOT	ROAD	LEND	LOW	ROOT
DINT	PEEN	CHIN	VEAL	TINT	BEAN	GIN	FEEL
DECK	MAD	MEND	DAB	NECK	BAD	BEND	NAB
THONG	VOX	CHAW	BON	TONS	BOX	SHAH	VON
C00	GO	JUICE	8012	CHOO	JOE	GOOSE	THOLE
REED	BID	PEEK	THIN	HEED	DID	TEAK	FIN
SHAG	YEN	BAT	PEG	SAG	WREN	BAT	KEB
ROT	RAW	LOCK	LONG	LOT	LAW	ROCK	HRONG
VOLE	Z 00	COAT	TUNE	FOAL	SUE	BOAT	DUNE
DIP	NEED	MIT	BEET	NIF	DEED	817	MEET
PENCE	THAN	THEN	CHAD	FENCE	DAN	DEN	SHAD
THAN	COP	JAHS	JOT	BAW	CHOP	BAUZE	807
POOL	FORE	NOON	DOLE	TOOL	THOR	MOON	BOHL
VIELD	FIT	TEA	GILL	HIELD	HIT	KEY	DILL
LAP	REST	RAMP	LEND	RAP	LEST	LAMP	REND

PAGE	1	PAGE 2		PAGE	3	PAGE 4	
808	TOOT	TEST	PAN	808	COOT	PEST	PAN
DAUNT	POND	FAULT	JDCK	TAUNT	BOND	VAULT	CHOCK
MOOT	MOAN	DUES	DOTE	8001	BONE	NEWS	NOTE
SHEET	VILL	BEE	TICK	CHEAT	BILL	VEE	THICK
GAB	GUEST	SANK	CHAIR	JAB	JEST	THANK	CARE
POT	THOUGHT	ROD	BONS	TOT	FOURHT	WAD	DONE
GHOST	POOP	80	YDU	BOAST	COOP	SHOW	RUE
LIP	REAP	RID	LEEK	RIP	LEAP	LID	REEK
ZED	VAST	TENSE	CALF	BATO	FAST	DENSE	GAPP
DAH	KNOCK	M085	BOMB	SNAN	DOCK	8088	MOM
CHOOSE	THOSE	F00	DOUGH	8:1028	DOZE	POOH	THOUGH
KEEP	SING	ZEE	BILT	CHEEP	THING	THEE	JILT
BANK	NET	THAD	PENT	DANK	HET	FAD	TENT
GOT	TAUSHT	FOP	YAHL	DOT	CAUBHT	HOP	HALL
LOAD	RUDE	ROM	LOOT	ROAD	LEND	LOW	ROOT
TINT	BEAN	GIN	PEEL	DINT	PEEN	CHIN	VEAL
DECK	BAO	MEND	NAB	NECK	MAD	BEND	DAB
THONG	VOX	CHAH	BON	TONG	BOX	SHAN	VON
CHOO	60	SOOSE	SOLE	COO	JOE	JUICE	THOLE
WEED	010	TEAK	PIN	REED	BID	PEEX	THIN
SHAG	HREN	BAT	KEG	SAG	YEN	BAT	PES
ROT	LAW	LOCK	WRONG	LOT	RAW	ROCK	LONG
VOLE	SUE	COAT	DUNE	FOAL	700	GOAT	TUNE
DZP	DEED	MIT	MEET	NIP	NEED	817	BEET
PENCE	DAN	THEN	SHAD	PENCE	THAN	DEN	CHAD
THAH	CHOP	JAHS	901	BAH	COP	GAUZE	JOT
PODL	THOR	NOON	BOWL	TOOL	FORE	MOON	DOLE
YIELD	FIT	TEA	GILL	WIELD	HIT	KEY	DILL
LAP	REST	RAMP	LEND	RAP	LEST	LAMP	REND

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PAGE	1	PAGE	•	PAGE	3	PAGE 4	
608	COOT	TEST	PAN	808	T007	PEST	FAN
TAUNT	FOND	VAULT	JOCK	DAUNT	BOND	FAULT	CHOCK
BOOT	BONE	NEHS	NOTE	MOST	HOAN	DUES	DOTE
CHEAT	VILL	VEE	TICK	SHEET	BILL	BEE	THICK
GAB	JEST	BANK	CARE	JAB	GUEST	THANK	CHAIR
POT	FOURHT	ROD	DONG	TOT	THOUGHT	WAD	BONG
BOAST	POOP	SHOW	YOU	GHOST	COOP	80	RUE
LIP	REAP	RID	LEEK	RIP	LEAP	LID	REEK
SAID	FAST	DENSE	GAFF	260	YAST	TENSE	CALF
SNAM	DOCK	8088	MOM	DAW	KNOCK	HOSS	BOHB
SHOES	THOSE	POOH	DOUGH	CHOOSE	0026	FOO	THOUGH
KEEP	THING	ZEE	JILT	CHEEP	BING	THEE	BILT
BANK	NET	THAD	PENT	DANK	MET	FAD	TENT
807	TAUGHT	FOP	YANL	DOT	CAUGHT	HOP	WALL
ROAD	RUDE	LOW	LOOT	LOAD	LEWD	ROW	ROOT
DINT	PEEN	CHIN	VEAL	TINT	BEAN	BIN	PEEL
DECK	MAD	MEND	DAB	NECK	BAD	BEND	NAB
THONG	VOX	CHAW	BON	TONG	BOX	SHAW	VON
CHDD	JOE	GDOSE	THOLE	000	90	JUICE	BOLE
HEED	810	TEAK	THIN	REZD	DID	PEEK	FIN
BAS	YEN	GAT	PEG	SHAG	HREN	BAT	KEG
LOT	LAW	ROCK	PRONG	ROT	RAH	LOCK	LONG
VOLE	S U E	COAT	DUNE	FOAL	200	GOAT	TUNE
DIP	NEED	HIT	BEET	NIP	DEED	BIT	MEET
PENCE	DAN	DEN	SHAD	PENCE	THAN	THEN	CHAD
THAM	COP	JAWS	JOT	BAW	CHOP	GAUZE	GOT
TOOL	THOR	MOON	BONL	POOL	FORE	NOON	DOLE
VIELD	FIT	TEA	GILL	WIELD	HIT	KEY	DILL
RAP	LEST	LAMP	REND	LAP	REST	RAMP	LEND

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PAGE 1		PAGE 2		PAGE	3	PASE 4	
608	COOT	PEST	PAN	909	7007	TEST	FAN
TAUNT	BOND	VAULT	CHOCK	DAUNT	POND	PAULT	JOCK
BOOT	BONE	NEWS	NOTE	HOOT	MBAN	DUES	DOTE
SHEET	BILL	BEE	THICK	CHEAT	VILL	VEE	TICK
JAB	GUEST	THANK	CHAIR	GAB	JEST	SANK	CARE
TOT	FOUGHT	WAD	DONE	POT	THOUGHT	ROD	BONS
BOAST	COOP	SHOH	RUE	GHOST	POOP	80	YOU
RIP	REAP	LID	LEEK	LIP	LEAP	RID	REEK
ZED	PAST	TENSE	GAFF	BATO	VAST	DENSE	CALF
GNAH	DOCK	8085	HOH	DAM	KNOCK	MOSS	BOMB
SHOES	THOSE	POOH	DOUGH	CHOOSE	DOZE	F00	THOUGH
CHEEP	SING	THEE	GILT	XEEP	THING	266	JILT
BANK	NET	THAD	PENT	DANK	MET	FAD	TENT
DOT	CAUBHT	HOP	WALL	GOT	TAUGHT	FOP	YAWL
LOAD	LEHO	ROW	ROOT	ROAD	RUDE	LOW	LOOT
DINT	PEEN	CHIN	VEAL	TINT	BEAN	BIN	PEEL
NECK	MAD	BEND	DAB	DECK	BAD	MEND	NAB
TONG	BOX	SHAH	VON	THONG	VOX	CHAH	NOA
CHOO	JOE	GOOSE	THOLE	600	GO	JUICE	BOLE
REED	DIO	PEEK	PIN	WEED	810	TEAK	THIN
SHAG	YEN	BAT	PEG	SAG	HREN	GAT	KE8
ROT	LAW	LOCK	WRONG	LOT	RAW	ROCK	LONG
VOLE	8UE	COAT	DUNE	FOAL	100	GOAT	TUNE
DIP	NEED	HIT	BEET	NIP	DEED	BIT	HEET
PENCE	DAN	THEN	SHAD	PĒNCE	THAN	DEN	CHAD
SAH	CHOP	GAUZE	GOT	THAM	COP	JAWB	70 t
POOL	THOR	NOON	BOHL	TOOL	FORE	MOON	DOLE
WIELD	PIT	KEY	GILL	VIELD	HIT	TEA	DILL
LAP	REST	RAMP	LEND	RAP	LEST	LAMP	REND

PAGE	•	PAGE 2		PAGE	3	PAGE 4	
GÓB	TOOT	TEST	PAN	808	COOT	PEST	PAN
DAUNT	BOND	PAULT	CHOCK	TAUNT	POND	VAULT	JOCK
8007	MOAN	NEWS	DOTE	HOOT	BONE	DUES	HOTE
CHEAT	BILL	VEE	THICK	SHEET	VILL	156	TICK
GAB	SUEST	BANK	CHAIR	JAB	JEST	THANK	CARE
POT	FOUGHT	ROD	DONE	TOT	THOUGHT	MAD	BONG
SHOST	COOP	80	RUE	BOAST	POOP	SHOW	YOU
RILL	NEAP	NIP	HREATH	NILL	REAP	RIP	NEATH
BAID	FAST	DENSE	GAPP	160	VAST	TENSE	CALF
SNAM	KNOEK	8088	BOMB	DAW	DOCK	M088	HOH
SHOES	DOZE	POOH	THOUGH	CHOOSE	THOSE	FOO	DOUGH
KEEP	THINB	ZEE	JILT	CHEEP	BING	THEE	OILT
BANK	NET	THAD	PENT	DANK	MET	PAD	TENT
GOT	CAUGHT	FOP	WALL	DOT	TAUGHT	HOP	YAHL
NOSE	NUDE	RODE	ROOSE	ROSE	RUDE	NODE	NOOSE
TINT	BEAN	GIN	PEEL	DINT	PEEN	CHIN	VEAL
DECK	MAD	MEND	DAB	NECK	BAD	BEND	NAB
THOMS	BOX	CHAH	VON	TONG	VOX	SHAW	BON
COO	60	JUICE	SOLE	CHEN	10E	8008E	THOLE
MEED	DID	TEAK	PIN	REED	810	PEEK	THIN
SAG	WREN	SAT	KEG	SHAG	YEN	BAT	PES
KNOB	HROUGHT	ROT	GNAW	ROB	NOUSHT	NOT	RAH
VOLE	200	COAT	TUNE	FOAL	SUE	GOAT	DUNE
DIF	NEED	HIT	BEET	NIP	DEED	BIT	HEET
PENCE	DAN	THEN	SHAD	FENCE	THAN	DEN	CHAD
8 A W	COP	GAUZE	JOT	THAM	CHOP	JAMS	607
TOOL	THOR	HOON	BCML	POOL	FORE	NOON	DOLE
YIELD	FIT	TEA	OILL	WIELD	HIT	KEY	DILL
SHAT	REST	RAP	NED	RAT	NEST	NAP	RED

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PAGE	1	PASE 2		PAGE	3	PAGE 4	
808	7007	TEST	FAN	808	COOT	PEST	PAN
DAUNT	POND	PAULT	JOCK	TAUNT	BOND	VAULT	CHOCK
8007	BONE	NEWS	NOTE	HOOT	MOAN	DUES	007 €
CHEAT	VILL	VEE	TICK	SHEET	BILL	926	THICK
BAB	SUEST	BANK	CHASE	JAB	JEST	THANK	CARE
POT	THOUSERT	ROD	BONG	707	FOUSHT	WAD	DONE
BOAST	COOP	SHON	RUE	SHOST	POOP	80	YOU
NILL	HEAP	RIP	HREATH	RILL	REAP	NIP	NEATH
SED	PAST	TENSE	BAFF	BATO	VAST	DENSE	CALP
BNAH	KNOEK	8088	BOMB	DAN	DOCK	MOSS	MDM
SHOES	DOZE	POOH	THOUGH	CHOOSE	THOSE	700	DOUGH
	THING	126	JILT	CHEEP	SINS	THEE	BILT
KEEP	HET	THÁD	TENT	DANK	NET	PAD	PENT
BANK	CAUSHT	HOP	HALL	807	TAUBHT	FOP	YAWL
DOT	NUDE	NODE	ROOSE	NORE	RUDE	RODE	HOOSE
ROSE	PEEN	BIN	VEAL	DINT	BEAN	CHIN	FEEL
TINT	MAD	HÉND	DAS	HECK	BAD	BEND	NAB
DECK	801	MAN	VON	THONS	VOX	CHAN	BON
TONE		60036	THOLE	600	60	JUICE	BOLE
CHEM	300	PEEK	PIN	WEED	910	TEAR	THIN
REED	DID	DAT	PES	246	WREN	GAT	KEG
SHAB	YEN	ROT	SNAW	ROB	HOUGHT	NOT	RAH
KNOB	HROUGHT		DUNE	FOAL	200	BOAT	TUNE
VOLE	8U 2	COAT		012	DEED	MIT	MEET
NIP	NEED	BIT	AUET	PENCE	THAN	THEN	CHAD
Pence	DAN	DEN	SHAD		COP	JAWA	JOT
SAH	CHOP	BAULE	807	PHAM	FORE	NODN	DOLE
TOOL	THOR	HOON	BOWL	POOL		724	SILL
HIELD	HIT	KEY	DILL	AIETD	FIT	RAP	RED
RAT	REST	NAP	NED	BNAT	HEST	MAP	

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808	COOT	TEST	PAN	808	TOOT	PEST	FAN
TAUNT	BOND	VAULT	CHOCK	DAUNT	POND	PAULT	JOCK
MOOT	MOAN	DUES	DOTE	ROOT	BONE	HEHB	NOTE
CHEAT	VILL	VEE	TICK	SHEET	BILL	318	THICK
JAB	SUEST	THANK	CHAIR	SAB	JEST	BANK	CARE
POT	FOURHT	ROD	DONE	TOT	THOUGHT	WAD	80N8
BOAST	COOP	SHOW	RUE	CHOST	POOP	80	104
RILL	NEAP	NIP	WREATH	NILL	REAP	RIP	NEATH
SAID	PAST	DENSE	GAFF	ZEO	VAST	TENBE	CALF
DAW	DOCK	HOSE	MOM	BNAH	KNDCK	9028	BOMB
CHOOSE	DOZE	POJ	THOUSH	8H0E8	THOSE	POCH	DOUGH
KEEP	SINB	ZEE	BILT	CHEEP	THING	THEE	JILT
BANK	NET	THAD	PENT	DANK	HET	FAD	TENT
807	CAUSHT	FOP	WALL	007	TAUGHT	HOP	AVML
ROSE	NUDE	NODE	ROOSE	NOSE	RUDE	ROOK	NODSE
TINT	BEAN	GIN	FEEL	DINY	PEEN	CHIN	VEAL
DECK	BAD	MEND	HAB	NECK	MAD	BEND	DAB
THONS	BOX	CHAW	YON	TONS	VOX	SHAH	BON
CHEN	JOE	GOOSE	THOLE	COO	60	JUICE	BOLE
REED	810	PEEK	THIN	WEED	DID	TEAK	FIN
SHAS	YEN	BAT	PES	8 4 6	HREN	BAT	KEG
R 08	HOUGHT	NOT	RAW	KNOB	WROUGHT	ROT	SNAW
VOLE	200	COAT	TUNE	POAL	\$UE	BOAT	DUNE
NIP	NEED	BIT	35ET	DIP	DEED	MIT	HEET
PENCE	DAN	THEN	SHAD	FENCE	THAN	DEN	CHAD
SAH	CHOP	GAUZE	807	THAN	COP	JAWE	JOT
TOOL	PORE	MOON	DOLE	POOL	THOR	NOON	BOWL
WIELD	PIT	KEY	GILL	YIELD	HIT	TEA	DILL
RAT	REST	NAP	NED	SHAT	NEST	RAP	RED

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DAUNT	POND	FAULT	JOCK	TAUNT	BOND	VAULT	CHOCK
8007	BONE	HEHS	NOTE	MODT	MOAN	DUES	DOTE
CHEAT	VILL	VEE	TICK	BHEET	BILL	BEE	THICK
JAB	JEBT	THANK	CARE	GAB	SUEST	BANK	CHAIR
POT	FOUGHT	ROD	DONE	TOT	THOUGHT	WAD	BONG
84087	POOP	80	Y6U	BÓAST	COOP	BHOM	RUE
NILL	NEAP	RIP	HREATH	RILL	REAP	NIP	NEATH
250	PAST	TENSE	BAFF	BATO	VAST	DENSE	CALF
DAW	KNOCK	MQ83	BOMB	BNAW	DOCK	8088	MOM
CHOOSE	DOZE	700	THOUGH	SHOES	THOSE	POOH	DOUGH
KEEP	SING	122	SILT	CHEEP	THING	THER	JILT
BANK	HET	THAD	TENT	DANK	NET	FAB	PENT
607	CAUSHT	FOP	WALL	DOT	TAUSHT	HOP	YANL
NOSE	NUDE	RODE	ROOSE	ROSE	RUDE	NODE	HOOSE
DINT	PEEN	CHIN	VEAL	TINT	BEAN	BIN	PEEL
DECK	MAD	MEND	DAS	NECK	BAD	BEND	NAS
TONE	BOX	SHAW	YON	THONG	VOX	CHAW	BON
COO	80	JUICE	80L2	CHEK	JOE	80082	THOLE
MEED	810	TEAK	THÍN	REED	DID	PEEK	PIN
848	WREH	BAT	KER	SHAG	YEN	BAT	PEB
KNOB	WROUSHT	ROT	BHAW	808	HOUSHT	NOT	RAW
VOLE	200	COAT	TUNE	FOAL	SUE	BOAT	DUNE
NIP	NEED	BIT	DEET	DIP	DEED	MIT	MEET
PENCE	DAN	THEN	BHAD	PENCE	THAN	BEN	CHAD
SAH	COP	GAUZE	JOT	THAM	CHOP	JAWB	607
POOL	THOR	NOON	BOWL	TOOL	FORE	MOON	DOLE
MIELD	HIT	KEY	DILL	YIELD	FIT	TEA	BILL
BNAT	REST	RAP	NED	RAT	NEBT	NAP	RED

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809	7007	TEST	FAN	808	0000		
DAUNT	8040	PAULT	CHOCK	TAUNT	COOT	PEST	PAN
8007	BONE	NEWB	NOTE	MOOT	POND	VAULT	JOCK
BHEET	DILL	BEE	THICK	CHEAT	MBAN	DUES	DOTE
JAB	BUEST	THANK	CHAIR	BAB	VILL	VEE	TICK
TOT	POURHT	WAD	DONE		JEST	SANK	CARE
BOAST	POOP	SHOW	YOU	POT	THOUGHT	ROD	BONG
RILL	REAP	NIP	NEATH	BHOST	COOP	\$0	RUE
260	PAST	TENAL	BAFF	Nith	NEAP	RIP	WREATH
DAW	DOCK	MOSS	HOM	BATO	VAST	DENSE	CALF
SHOES	THOSE	POOH		BNAW	KNOCK	8088	BOMB
CHEEP	THING	THEE	ролен	CHOOSE	DOZE	FOO	THOUGH
DANK	NET	PAD	JILT	KEEP	SING	ZER	GILT
GOT	CAUSHT		PENT	BANK	MET	THAD	TENT
ROSZ		FOP	WALL	DOT	TAUSHT	HOP	YAWL
TINT	NUDE	NODE	RODSE	HOSE	RUDE	RODE	NOOSE
NECK	BEAN	GIN	FERL	DINT	PEEN	CHIN	VEAL
	HAD	BEND	DAB	DECK	BAD	MEND	NAB
THOME	BOX	CHAW	VON	TONG	VOX	SHAW	BON
C00	JOE	Inice	THOLE	CHEM	8 0	2008E	SOLE
MEED	BID	TEAK	THIN	REED	DIO	PEEK	FIN
SHAG	YEN	BAT	PEG	SAG	HREN	BAT	KES
KNOB	NOUBHT	ROT	RAW	808	HROUGHT	NOT	GNAH
FOAL	200	GOAT	TUNE	VOLE	802	COAT	DUNE
DIP	DEED	MIT	MEET	NIP	NEED	917	BEET
PENCE	DAN	THEN	SHAD	PENCE	THAN	DEN	CHAO
THAN	CHOP	JAWB	GOT	BAW	COP	BAULF	J07
POOL	FORE	NGON	DOLE	TOOL	THOR	MOON	
YIELD	FIT	TEA	BILL	WIELD	MIT	KEY	BOML
RAT	REST	NAP	NED	GNAT	NEST	RAP	DILL

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GOB	COOT	TEST	PAN	808	1001	PEST	FAN
TAUNT	BOND	VAULT	CHOCK	DAUNT	POND	PAULT	JOCK
BOOT	BONE	NEHS	HOTE	HOOT	MOAN	DUES	DOTE
CHEAT	VILL	YEE	TICK	SHEET	BILL	BEE .	THICK
GAB	SUEST	BANK	CHAIR	JAR	JEST	THANK	CARE
POT	FOUGHT	ROD	DONG	TOT	THOUGHT	WAD	BONG
BOAST	COOP	SHOH	RUE	SHOST	POOP	80	YOU
NILL	REAP	RIP	NEATH	RILL	NEAP	NIP	HREATH
ZEO	VAST	TENSE	CALF	BAID	FAST	DENSE	GAFF
BNAP	KNOCK	6088	BOMB	DAW	DOCK	HOSS	HOM
CHOOSE	UOZE	F00	THOUGH	SHOES	THOSE	POOH	DOUGH
CHEEP	81NB	THEE	GILT	KEEP	THING	222	JILT
BANK	NET	THAD	PENT	DANK	HET	FAD	TENT
201	TAUGHT	HOP	YAHL	GOT	CAUGHT	POP	WALL
ROSE	NUOE	NODE	ROOSE	NOSE	RUDE	RODE	NOOSE
TINT	BEAN	GIN	PEEL	DINT	PEEN	CHIN	VEAL
NECK	BAD	BEND	NAB	DECK	MAD	HEND	DAB
THONG	VOX	CHAW	BON	TONG	BOX	SHAW	VON
CHEN	JOE	GODSE	THOLE	000	90	JUICE	SOLE
WEED	810	TEAK	THIN	REED	010	PEEK	FIN
SHAG	YEN	BAT	PEG	BAG	HREN	GAT	KEG
ROB	NOUGHT	NOT	RAW	KNOS	HROUGHT	ROT	GNAW
VOLE	100	COAT	TLINE	FOAL	BUE	GOAT	DUNE
NIP	NEED	BIT	BEET	DIP	DEED	MIT	MEET
PENCE	THAN	DEN	CHAD	PENCE	DAN	THEN	BHAD
THAN	COP	JAHS	JOT	BAW	CHOP	GAUZE	807
POOL	FORE	NOON	DOLE	TOOL	THOR	MOON	BONL
WIELD	HIT	KEY	DILL	YIELD	PIT	TEA	BILL
GNAT	NEST	RAP	RED	RAT	REST	NAP	NED

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TAUNT	POND	VAULT	JOCK	DAUNT	BOND	PAULT	CHOCK
BOOT	MOAN	NEW S	DOTE	HOOT	BONE	DUES	NOTE
CHEAT	BILL	VEE	THICK	SHEET	VILL	DEE	TICK
GAB	JEST	BANK	CARE	JAB	BUEST	THANK	CHAIR
TOT	THOUSHT	WAD	BONS	POT	FOUSHT	RDD	DONE
BOAST	POOP	SHOW	YOU	SHOST	COOP	80	RUE
NILL	REAP	RIP	NEATH	RILL	NEAP	NIP	WREATH
260	PAST	TENSE	BAFF	BAID	VAST	DENSE	CALF
DAH	DOCK	MOSS	MOM	BNAH	KNOCK	8088	BOMB
CHOOSE	DOZE	FOO	THOUGH	SHOES	THOSE	POOH	DOUGH
CHEEP	THING	THEE	JILT	KEEP	SINS	222	BILT
BANK	NET	THAD	PENT	DANK	HET	PAD	TENT
007	TAUGHT	HOP	YAHL	807	CAUSHT	3.5	WALL
ROSE	NUDE	NODE	ROOSE	NITE	RUDE	RADE	NOOSE
TINT	BEAH	GIN	PEEL	D:	PEEK	CHIN	VRAL
SECK	BAU	MEND	NAB	NECK	MAD	BEND	DAB
THONS	VOX	CHAW	96N.	TONG	BOX	SHAW	YON
600	60	JUICE	BOLE	CHEM	JOE	6008E	THOLE
REED	BID	PEEK	THIN	WEED	DID	TEAK	PIN
SHAG	HREN	BAT	KEG	BAG	YEN	GAT	PEG
#08	NOUSHT	NOT	RAW	KNOB	WROUGHT	ROT	SNAW
FOAL	SUE	GDAT	DUNE	VOLE	Z00	COAT	TUNE
NIP	NEED	BIT	BEET	DIP	DEED	MIT	MEET
FENCE	THAN	DEN	CHAD	PENCE	DAN	THEN	SHAD
SAW	CHOP	GAUZE	SOT	THAM	COP	JAWS	JOT
POOL	FORE	NOON	JOLE	TOOL	THOR	HOON	BOWL
YIELD	FIT	TEA	BILL	HIELD	HIT	KEY	DILL
GNAT	NEST	RAP	RED	RIT	REST	NAP	NED

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808	CDOT	PEST	PAN	GOR	TOOT	TEST	FAN
TAUNT	PONO	VAULT	JOCK	DAUNT	BOND	PAULT	CHOCK
MOOT	BONE	DUES	NOTE	1009	MOAN	NEWS	DOTE
CHEAT	VILL	VEE	TICK	SHEET	BILL	BEE	THICK
. GAB	JEST	SANK	CARE	JAB	GUEST	THANK	CHAIR
POT	POUGHT	ROD	DONG	TOT	THOUGHT	WAD	BONG
GHOST	COOP	80	RUE	BOAST	POOP	SHOW	YOU
RILL	REAP	NIP	NEATH	NILL	NEAP	RIP	HREATH
BAID	FAST	DENSE	GAFF	220	VAST	TENSE	CALF
GNAW	KNOCK	8088	BOMB	DAW	DOCK	MO38	MOM
SHOES	THOSE	POOH	DOUGH	CHOOSE	DOZE	F00	THOUGH
CHEEP	THING	THEE	JILT	KEEP	SING	ZEE	GILT
DANK	HET	FAD	PENT	BANK	HET	THAD	TENT
DOT	CAUGHT	HOP	WALL	601	TAUGHT	FOP	YAWL
#08E	RUDE	NODE	NOOSE	NOSE	NUDE	RODE	ROOSE
TINT	BEAN	GIN	FEEL	DINT	PEEN	CHIN	VEAL
DECK	BAD	MEND	NAB	NECK	MAD	BEND	DAB
THOME	V D X	CHAW	BON	TONG	BOX	SHAH	VON
C00	JOE	Juice	THOLE	CHEW	50	GOOSE	SOLE
MEED	810	TEAK	THIN	REED	DID	PEEK	FIN
BAG	YEN	GAT	PEG	SHAG	WREN	BAT	KEG
#0B	WROUGHT	HOT	SNAH	KNDB	NOUGHT	ROT	RAW
VOLE	Z00	COAT	TUNE	FOAL	SUE	GOAT	DUNE
DIP	NEED	MIT	BEET	NIP	DEED	BIT	MEET
PENCE	THAN	THEN	CHAD	PENCE	DAN	DEN	SHAD
THAN	CHOP	JAHS	GOT	SAW	COP	GAUZE	JOT
TOOL	THOR	MOON	BOWL	PONL	FORE	NOON	DOLE
MIELD	HIT	KEY	DILL	VIELD	FIT	TEA	GILL
RAT	REST	NAP	NED	GNAT	NEST	RAP	RED

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GOB	COOT	TEST	PAN	808	TOOT	PEST	FAN
TAUNT	BOND	VAULT	CHOCK	DAUNT	POND	FAULT	JOCK
HOOT	BONE	DUES	NOTE	RODT	MOAN	NEWS	DOTE
SHEET	VILL	BEE	TICK	CHEAT	BILL	VEE	THICK
GAB	JEST	BANK	CARE	JAR	GUEST	THANK	CHAIR
POT	FOUGHT	ROD	DONG	TOT	THOUGHT	WAD	BONG
	POOP	8H0H	YOU	GHOST	COOP	50	RUE
BOAST	REAP	NIP	NEATH	NILL	NEAP	RIP	HREATH
RILL	FAST	DENSE	GAFF	ZEO	VAST	TENBE	CALF
SAID	KNOCK	MOSS	8048	GNAM	DOCK	8088	HOM
DAH	DOZE	POOH	THOUGH	CHOOSE	THOSE	P00	DOUGH
SHOES	SING	ZEE	GILT	CHEEP	THING	THEE	JILT
KEEP	NET	FAD	PENT	BANK	MET	THAD	TENT
DANK	TAUGHT	HOP	VAWL	GOT	CAUGHT	FOP	HALL
007		NODE	NOOSE	NOSE	NUDE	RODE	ROOSE
ROSE	RUOE PEEN	CHIN	VEAL	TINT	BFAN	GIN	FEEL
DINT	BAD	BEND	NAB	DECK	MAD	MEND	DAB
NECK TONG	VOX	SHAM	BON	THONG	80 X	CHAH	VON
	JOE	GOOSE	THOLE	con	60	JUICE	SOLE
CHEN	810	PEEK	THIN	WEED	010	TEAK	FIN
REED	YEN	GAT	PEG	SHAG	HREM	BAT	KEG
SAG	NOUGHT	POT	RAW	ROB	WROUGHT	NOT	GNAW
KNOB Foal	SUE	GOAT	DUNE	VOLE	200	COAT	TUNE
	NEED	MIT	BEET	NIP	DEED	BIT	MEET
DIP	DAN	THEN	SHAD	FENCE	THAN	DEN	CHAD
PENCE	CHOP	JANS	GOT	BAN	COP	GAUZE	JOT
THAH		NOON	DOLE	TOOL	THOR	MOON	BOWL
POOL	FORE	TEA	GILL	WIELD	HIT	KEY	DILL
AIEFO	FIT	PAP	NED	RAT	NEST	NAP	RED
GNAT	REST	FAF	14E D	7 4			

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TAUNT	BOND	VAULT	CHOCK	DAUNT	POND	PAULT	JOCK
HODT	BONE	DUES	NOTE	BOOT	HOAN	NEWS	ODTE
CHEAT	VILL	VEE	TICK	SHEET	BILL	BEE	THICK
JAB	GUEST	THANK	CHAIR	GAR	JEST	SANK	CARE
POT	FOUGHT	ROD	DONG	TOT	THOUGHT	MAD	BONG
GHOST	POOP	80	YOU	BOAST	COOP	SHOW	RUE
NILL	REAP	RIP	NEATH	RILL	NEAP	NIP	WREATH
SAID	FAST	DENSE	GAFF	ZED	VAST	TENSE	CALF
DAW	KNOCK	MOSS	80M8	GNAN	DOCK	8033	MOM
CHOOSE	DOZE	Fon	THOUGH	84023	THOSE	POOH	DOUGH
KEEP	SING	ZEE	GILT	CHEEP	THING	THEE	JILT
DANK	MET	FAD	TENT	BANK	NET	THAD	PENT
GOT	TAUGHT	FOP	YAHL	DOT	CAUGHT	HOP	WALL
NOSE	NUDE	RODE	ROOSE	ROSE	RUDE	NODE	NOUSE
DINT	BEAN	CHIN	FEEL	TINT	PEEN	GIN	VEAL
DECK	BAD	MEND	NAB	NECK	MAD	BEND	DAB
TONG	VOX	SHAN	BON	THONG	BOX	CHAW	VON
CHEN	JOE	GOOSE	THOLE	COD	80	JUICE	SOLE
REED	DID	PEEK	FIN	NEED	BIO	TEAK	THIN
SAG	YEN	GAT	PEG	SHAG	WREN	BAT	KEG
ROB	HOUGHT	NOT	RAW	KNOB	WROUGHT	ROT	GNAW
FOAL	200	GOAT	TUNE	VOLE	SUE	COAT	DUNE
DIP	NEED	MIT	BEET	NIP	DEED	BIT	MEET
PENCE	DAN	DEN	SHAD	PENCE	THAN	THEN	CHAD
THAM	COP	JANS	JOT	SAN	CHOP	GAUZE	GOT
TOOL	THOR	MOON	BOWL	POOL	FORE	NOON	DOLE
WIELD	HIT	KEY	DILL	YIELD	FIT	TEA	GILL
GNAT	REST	RAP	NED	RAT	NEST	NAP	RED

PAGE	1	PAGE	PAGE 2 PAGE 3 PAG		GE P PAGE 3 PAGE 4		. 4
808	COOT	PEST	PAN	GOR	TOOT	TEST	FAN
TAUNT	BOND	VAULT	CHOCK	DAUNT	POND	FAULT	JOCK
MOOT	MOAN	DUES	DOTE	BOOT	BONE	NEWS	NOTE
CHEAT	BILL	YEE	THICK	SHEET	VILL	BEE	TICK
GAB	GUEST	BANK	CHAIR	JAB	JEST	THANK	CARE
TOT	THOUGHT	MAD	BONG	POT	POUGHT	ROD	DONG
BOAST	POOP	SHOW	YOU	GHOST	COOP	30	RUE
RILL	REAP	NIP	NEATH	NILL	NEAP	RIP	WREATH
SAID	VAST	DENSE	CALF	ZED	FAST	TENSE	GAFF
DAW	KNOCK	HOSS	BOMB	GNAW	DOCK	BOSS	MOM
CHOOSE	THOSE	FOO	DOUGH	SHOES	DOZE	POOH	THOUGH
CHEEP	SING	THEE	GILT	KEEP	THING	ZEE	JILT
DANK	NET	FAD	PENT	BANK	HET	THAD	TENT
DOT	CAUGHT	HOP	WALL	GOT	TAUGHT	FOP	YAWL
NOSE	NUCE	RODE	ROOSE	ROSE	RUDE	NODE	NOOSE
TINT	BEAN	GIN	FEEL	DINT	PEEN	CHIN	VEAL
DECK	MAD	MEND	D 4 5	NECK	BAD	BEND	NAB
TONG	VOX	SHAW	BON	THONG	BOX	CHAH	VON
CHEM	JOE	GOUSE	THOLE	COO	GO	JUICE	SOLE
REED	DID	PEFK	FIN	WEED	BIO	TEAK	THIN
8 A G	YEN	GAT	PEG	SHAG	WREN	BAT	KEG
KNOB	WROUGHT	POT	GNAW	ROB	NOUGHT	NOT	RAW
VOLE	200	COAT	TUNE	FOAL	SUE	GOAT	DUNE
NIP	DEED	BIT	MEET	DIP	NEED	HIT	BEET
PENCE	DAN	THEN	SHAD	PENCE	THAN	DEN	CHAD
SAW	CHOP	GAUZE	GOT	THAN	COP	JAWS	JOT
TOOL	THOR	MOR N	BOYL	POOL	FORE	NOON	DOLE
MIELD	FIT	KPY	GILL	YIELD	HIT	TEA	DILL
GNAT	REST	G AP	NED	RAT	NEST	NAP	RED

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608	COOT	TEST	PAN	ROR	TOOT	PEST	FAN
TAUNT	PDNO	VAULT	JOCK	DAUNT	BOND	FAULT	CHOCK
MOOT	MDAN	DuES	DOTF	ROOT	BONE	NEWS	NOTE
CHEAT	BILL	VEE	THICK	SHEET	VILL	BEE	TICK
-JAB	JEST	THANK	CARE	GAR	GUEST	SANK	CHAIR
TOT	THOUGHT	WAD	BONG	POT	FOUGHT	ROD	DONG
BOAST	POOP	SHOW	YOU	CHOST	COOP	30	RUE
RILL	NEAP	NIP	WREATH	NILL	REAP	RIP	NEATH
SAID	FAST	DENSE	GAFF	ZED	VAST	TENSE	CALF
GNAW	DOCK	8088	HOH	DAW	KNOCK	MOSS	BOMB
CHOOSE	DOZE	₽ŋô	THOUGH	SHOES	THOSE	POOH	DOUGH
KEEP	SING	ZEE	GILT	CHEEP	THING	THEE	JILT
BANK	HET	THAD	TENT	DANK	NET	FAD	PENT
DOT	TAUGHT	HOP	YAWL	GOT	CAUGHT	FOP	WALL
ROSE	NUDE	NODE	ROOSE	NOSE	RUDE	RODE	NOOSE
TINT	PEEN	GIN	VEAL	DINT	BEAN	CHIN	FEEL
NECK	BAD	BEND	NAB	DECK	MAD	MEND	DAB
THONG	VOX	CHAH	BON	TONG	BOX	SHAW	VON
CHEM	GO	GOOSE	SOLE	COD	JOE	JUICE	THOLE
REED	DID	PEEK	FTN	WEED	BIO	TEAK	THIN
SHAG	HREN	RAT	KEG	SAG	YEN	GAT	PEG
ROB	WROUGHT	NOT	GNAW	KNOB	NOUGHT	ROT	RAW
FOAL	SUE	GOAT	DIJNE	VOI, E	ZOO	COAT	TUNE
NIP	NEED	BIT	BEET	DIP	DEED	MIT	HEET
PENCE	DAN	THEN	SHAD	PENCE	THAN	DEN	CHAD
SAH	COP	GAUZE	JOT	THAW	CHOP	JAHS	GOT
TOOL	THOR	MOON	BOWL	POPL	FORE	NOON	DOLE
YIELD	FIT	TEA	GILL	WIELD	HIT	KEY	DILL
RAT	REST	NAP	NED	GNAT	NEST	RAP	RED

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8,08	COOT	PEST	PAN	GOB	1001	TEST	FAN
TAUNT	POND	VAULT	JOCK	DAUNT	BOND	FAULT	CHOCK
9007	MOAN	NEWS	DOTE	HOOT	BONE	DUES	NOTE
SHEET	VILL	REE	TICK	CHEAT	BILL	VEE	THICK
JAB	JEST	THANK	CARE	GAB	GUEST	SANK	CHAIR
POT	THOUGHT	ROD	BONG	TOT	FOURHT	WAD	DONG
BOAST	COOP	SHOW	RIIE	GHOST	POOP	80	YOU
NILL	REAP	RIP	NEATH	RILL	NEAP	NIP	WREATH
SAID	VAST	DENSE	CALF	ZED	FAST	TENSE	GAFF
GNAW	DOCK	8083	MDH	DAW	KNOCK	HOSS	BOMB
SHOES	DOZE	POOH	THOUGH	CHOOSE	THOSE	700	DOUGH
KEEP	THING	ZEE	JILT	CHEEP	SING	THEE	GILT
DANK	MET	FAD	TENT	BANK	NET	THAD	PENT
GOT	CAUGHT	FOP	WALL	DOT	TAUGHT	HOP	YANL
NOSE	NUDE	RODE	ROOSE	ROSE	RUDE	NODE	NOOSE
TINT	PEEN	GIN	VFAL	DINT	BEAN	CHIN	FEEL
DECK	BAD	MEND	NAB	NECK	MAD	BEND	DAB
TONG	80×	SHAW	VON	THONG	VOX	CHAW	BON
000	60	JUICE	SOLE	CHEH	JÖË	GOOSE	THOLE
WEED	010	TEAK	FIN	REED	810	PEEK	THIN
SHAG	YEN	BAT	PFG	SAG	HREN	GAT	KEG
KNOB	NOUGHT	ROT	RAH	POB	HROUGHT	NOT	GNAW
FOAL	200	GOAT	TUNE	VOLE	SUE	COAT	DUNE
DIP	DEED	HIT	MEET	NIP	NEED	BIT	BEET
PENCE	THAN	THEN	CHAD	FENCE	DAN	DEN	SHAD
THAW	COP	JAWS	JOT	SAH	CHOP	GAUZE	GOT
	THOR	NOON	80WL	TOOL	FORE	HOON	DOLE
PDOL Wield	HIT	KEY	DILL	VIELD	FIT	TEA	GILL
	NEST	NAP	RED	GNAT	REST	RAP	NED
RAT	MEG!	14 M.F	T (. U	17.VM [11 S W 1		

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808	TOOT	PEST	FAN	608	COOT	TEST	PAN
DAUNT	POND	FAULT	JOCK	TAUNT	BOND	VAULT	CHOCK
BOOT	BONE	NEWS	NOTE	HOOT	MDAN	DUES	DOTE
CHEAT	VILL	VEE	TICK	SHEET	BILL	BEE	THICK
BAB	JEST	BANK	CARE	JAB	GUEST	THANK	CHAIR
POT	FOUGHT	ROD	DONG	TOT	THOUGHT	WAD	BONG
BOAST	POOP	SHOW	YOU	GHOST	COOP	30	RUE
RILL	REAP	NIP	NEATH	NILL	NEAP	RIP	WREATH
SAID	VAST	DENSE	CALF	200	FAST	TENSE	GAFF
DAW	DOCK	M088	MOM	GNAN	KNOCK	8038	BOMB
CHOOSE	THOSE	FOO	рпивн	SHOES	DOZE	POOH	THOUGH
KEEP	THING	ZEE	JILT	CHEEP	SING	THEE	GILT
DANK	NET	PAD	PENT	RANK	MET	THAD	TENT
DOT	TAUGHT	HOP	YANL	607	CAUGHT	FOP	WALL
NOSE	RUDE	RODE	NOOSE	ROSE	NUTE	NODE	ROOSE
DINT	PEEN	CHIN	VEAL	TINT	BEAN	GIN	FEEL
DECK	MAD	MEND	DAB	NECK	BAD	BEND	NAB
THONG	80X	CHAM	VON	TONG	VOX	SHAW	BON
CHEW	GO	GOOSE	SOLE	con	JUE	JUICE	THOLE
WEED	010	TEAK	FIN	REFD	810	PEEK	THIN
SAG	YEN	GAT	PEG	SHAG	WREN	BAT	KEG
408	WROUGHT	NOT	GNAW	KNOB	NOUGHT	ROT	RAW
VOLE	SUE	COAT	DUNE	FOAL	ZOO	GOAT	TUNE
DIP	NEED	HIT	BEET	NIP	DEEN	BIT	MEET
PENCE	THAN	THEN	CHAD	FENCE	DAN	DEN	SHAD
SAW	COP	GAUZE	JOT	THAN	CHOP	JAWS	GOT
POOL	FORE	NOGN	DOLE	TOOL	THOR	MOON	BOWL
WIELD	FIT	KEY	GILL	YIFLD	HIT	TEA	DILL
RAT	NEST	NAP	RED	GNAT	REST	RAP	NED

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808	COOT	PEST	PAN	GOR	T00T	TEST	FAN
DAUNT	POND	FAULT	JUCK	TAUNT	BOND	VAULT	CHOCK
BOOT	BONE	NEHS	NOTE	HODT	MOAN	DUES	DOTE
SHEET	BILL	BEE	THICK	CHEAT	VILL	VEE	TICK
GAR	JEST	SANK	CARE	AAL	GUEST	THANK	CHAIR
POT	FOUGHT	ROD	DUNG	TOT	THOUGHT	WAD	BONG
ROAST	POOP	SHITH	400	GHOST	COOP	30	RUE
RILL	NEAP	NIP	WREATH	NIIL	REAP	RIP	NEATH
SAID	VAST	DENSE	CALF	ZEO	FAST	TENSE	GAFF
DAH	DOCK	MNSS	MOM	GNAW	KNOCK	BOSS	BOMB
SHOES	DOZF	POOH	THOUGH	CHOOSE	THOSE	FOO	DCUGH
CHEEP	THING	THEE	JILT	KEFP	SING	ZEE	GILT
DANK	NET	FAD	PFNT	RANK	MET	THAD	TENT
DOT	TAUGHT	HOP	YAWL	TOS	CAUGHT	FOP	WALL
NOSE	NUDE	RODE	ROSE	ROSE	RHOE	NODE	NOOSE
TINT	PFEN	GIN	VEAL	DINT	BFAN	CHIN	FEEL
DECK	MAD	HEND	DAB	NECK	BAD	BEND	NAB
THONG	VOX	CHAW	BON	TONG	BOX	SHAW	VON
CHEN	GN	GOOSF	SOLE	רחת	JNE	JUICE	THOLE
REED	810	PEEK	THIN	HEFO	nin	TEAK	FIN
SAG	YEN	GAT	PEG	SHAG	WREN	BAT	KEG
R 0 8	NOUGHT	NOT	RAW	KNOB	WROUGHT	ROT	GNAW
VOLE	SUE	COAT	DUNE	FOAL	200	GOAT	TUNE
NIP	NEED	BIT	BFET	ηŢΡ	DEED	MIT	MEET
FENCE	DAN	DEN	SHAD	PENCE	THAN	THEN	CHAD
SAH	COP	GAUZE	TOL	THAW	CHOP	JAWS	GOT
POOL	FORE	NOON	DOLE	TOOL	THOR	MOON	80⊭ <u>L</u>
YIELD	HIT	TEA	DILL	WIFLD	FIT	KEY	GILL
GNAT	REST	RAP	NFD	RAT	NEST	NAP	RED

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808	COOT	PEST	PAN	608	TOOT	TEST	FAN	
TAUNT	BOND	VAULT	CHOCK	DAUNT	POND	PAULT	JOCK	
ROOT	MBAN	NEWS	DOTE	MOOT	BONE	DUES	NOTE	
CHEAT	VILL	VEE	TICK	SHEET	BILL	955	THICK	
GAB	JEST	SANK	CARE	JAB	GUEST	THANK	CHAIR	
TOT	FOUGHT	WAD	DONG	POT	THOUGHT	ROD	BONG	
GHOST	COOP	80	RUE	ROAST	POOP	SHOW	YOU	
NILL	NEAP	RIP	WREATH	RILL	REAP	NIP	NEATH	
ZED	FAST	TENSE	GAFF	SAID	VAST	DENSE	CALF	
GNAH	KNOCK	B053	BOMB	DAW	DOCK	NO83	MOM	
CHOOSE	THOSE	FOO	DRUGH	SHOES	DOZE	POOH	THOUGH	
CHEEP	THING	THEE	JILT	KEEP	SING	ZEE	GILT	
BANK	NET	THAD	PENT	DANK	MET	PAD	TENT	
DOT	CAUGHT	HOP	WALL	GOT	TAUGHT	FOP	YAML	
NOSE	RUDE	RODE	NOOSE	ROSE	NUCE	NODE	ROOSE	
TINT	BEAN	GIN	FEEL	DINT	PEEN	CHIN	VEAL	
DECK	BAD	MEND	NAB	NECK	MAD	BEND	DAB	
TONG	VOX	SHAN	BON	THONG	80x	CHAN	VON	
600	JOE	JUICE	THOLE	CHEM	Gn	GOOSE	BOLE	
REED	BID	PEEK	THIN	WEED	DID	TEAK	FIN	
SHAG	WREN	BAT	KEG	SAG	YEN	BAT	PEG	
ROB	WROLIGHT	NOT	GNAW	KNOB	NOUGHT	ROT	RAW	
VOLE	zno	COAT	TUNE	FOAL	SIJE	GOAT	DUNE	
NIP	DEED	BIT	MEET	DIP	NEED	MIT	BEET	
PENCE	THAN	THEN	CHAD	FENCE	DAN	DEN	SHAD	
THAN	CHOP	JAHS	GOT	SAH	COP	GAUZE	JOT	
PODL	FORE	NOON	DOLE	TOOL	THOR	MOON	BONL	
WIELD	HIT	KEY	0166	VIELD	FIT	TEA	GILL	
GNAT	NEST	PAP	RED	RAT	REST	NAP	NED	

PAGE	1	PAGE 2		PAGE	3	PAGE 4	
808	COOT	PEST	PAN	GOR	TODT	TEST	FAN
TAUNT	50N0	VAULT	CHOCK	DAUNT	POND	FAULT	JOCK
MOOT	BONE	DUES	NOTE	8001	MOAN	NEW8	DOTE
SHEET	VILL	926	TICK	CHEAT	BILL	VEE	THICK
GAB	JEST	BANK	CARE	JAB	GUEST	THANK	CHAIR
POT	FOUGHT	ROD	DONG	TOT	THOUGHT	WAD	BONG
SHOST	POOP	80	YOU	BOAST	COOP	SHOW	RUE
RILL	REAP	NIP	NEATH	NILL	NEAP	RIP	WREATH
SAID	VAST	DENSE	CALF	ZED	FAST	TENSE	GAFF
GNAW	KNOCK	8033	BOMB	DAW	DOCK	MO38	MOM
SHOES	THOSE	POOH	DOUGH	CHOOSE	DOZE	FOO	THOUGH
CHEEP	THING	THEE	JILT	KEEP	SING	ZEE	GILT
BANK	MET	THAD	TENT	DANK	NET	FAD	PENT
GOT	CAUGHT	FOP	WALL	דמט	TAUGHT	HOP	YAWL
NOSE	RUDE	RODE	NOOSE	POSE	NUDE	NODE	ROOSE
DINT	PEEN	CHIN	VEAL	TINT	BEAN	GIN	FEEL
NECK	BAD	BEND	NAB	DECK	MAD	MEND	DAB
THONG	VOX	CHAW	BON	TONG	80X	SHAW	VON
CHEH	JOÉ	GOOSE	THOLE	COO	60	JUICE	SOLE
WEED	810	TEAK	THIN	REED	DIO	PEEK	FIN
SAG	WREN	GAT	KEG	SHAG	YEN	BAT	PEG
ROB	WROUGHT	NOT	GNAW	KNOB	NOUGHT	ROT	RAM
FOAL	ZOO	GOAT	TUNE	VOLE	89€	COAT	DUNE
DIP	NEED	MIT	BEET	NIP	DEED	BIT	MEET
FENCE	THAN	DEN	CHAD	PENCE	DAN	THEN	SHAD
SAW	CHOP	GAUZE	GOT	THAW	COP	JAWS	JOT
	THOR	MOON	BOWL	POOL	FORE	NOON	DOLE
TOOL	FIT	KEY	GILL	YIELD	HIT	TEA	DILL
WIELD Gnat	NEST	RAP	BED	RAT	REST	NAP	NED
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PAGE	•	PAGE P		PAGE	3	PAGE 4	
7406					cnot	PEST	PAN
Gne	1001	TEST	FAN	ROB	POND	FAULT	JOCK
TAUNT	DOND	VAULT	CHOCK	DAUNT	MOAN	DUES	DOTE
BOOT	BONE	HEMB	NOTE	F001	-	BEE	THICK
CHEAT	VILL	VEE	TICK	SHEET	BILL	SANK	CHAIR
JAB	JEST	THANK	CARE	GAR	GUEST	WAD	DONG
POT	THOUGHT	POD	BONG	707	FOUGHT	30	RUE
BOAST	POOP	SHOW	400	GHOST	COOP	RIP	NEATH
RILL	NEAP	NIP	WREATH	NILL	REAP	DENSE	CALF
ZED	PAST	TENSE	GAFF	SAID	VAST	MOSS	BOHB
GNAH	DOCK	8083	MOM	DAM	KNOCK	F00	DOUGH
SHOES	DOZE	POOH	THOUGH	CHOOSE	THOSE	ZEE	JILT
CHEEP	SING	THEE	GILT	KEEP	THING	FAD	TENT
BANK	NET	THAD	PENT	DVNK	MET	HOP	WALL
GOT	TAUGHT	FOP	YAML	763	CAUGHT		NOOSE
_	NUDE	RODE	RNNSE	ROSE	RUGE	NODE	FEEL
NOSE Tint	PEEN	GIN	VEAL	DINT	BEAN	CHIN	DAB
. •	BAD	BEND	NAB	DECK	MAD	MEND	VON
NECK	VOX	CHAW	BON	TONG	80 x	SHAW	THOLE
THONG	60	JUICE	SOLE	CHER	10£	GOOSE	FIN
500	BID	TEAK	THÌN	REED	010	PEEK	PEG
HEED	HREN	BAT	KEG	SAG	YEN	GAT	
SHAG	NOUGHT	NOT	RAW	KNUB	WROUGHT	ROT	GNAW
ROB	•	COAT	TUNE	FOAL	SUE	GOAT	DUNE
VOLE	700	HIT	MEET	NIP	NEED	BIT	BEET
niP	DEED	THEN	SHAD	FENCE	THAN	DEN	CHAD
PENCE	DAN	GAUZE	GDT	THAN	COP	SWAL	JOT
SAH	CHOP	MOON	DOLF	POOL	THOR	NOON	BOHL
TOOL	FORE	TEA	DILL	WIELD	FIT	KEY	GILL
YIELD	HIT		RED	RAT	REST	NAP	NED
CNAT	NE81	RAP	MEU		=		

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808	TOOT	PEST	FAN	GDB	COOT	TEST	PAN
DAUNT	POND	FAULT	JOCK	TAUNT	BOND	VAULT	CHOCK
HOOT	MOAN	DUES	DOTE	BOOT	BONE	NEW8	NOTE
CHEAT	BILL	VEE	THICK	SHEET	VILL	338	TICK
JAB	GUEST	THANK	CHAIR	GAB	JEST	SANK	CARE
POT	THOUGHT	ROD	BONG	TOT	POUGHT	WAD	DONG
BOAST	COOP	SHOW	RUE	CHOST	POOP	30	YOU
NILL	NEAP	RIP	WREATH	RILL	REAP	NIP	NEATH
ZED	FAST	TENSE	GAFF	SAID	VAST	DENSE	CALF
DAW	KNOCK	MO85	BOMB	GNAW	DOCK	8038	HOM
CHOOSE	THOSE	F00	рпивн	SHOES	DOZE	POON	THOUGH
KEEP	THING	ZEE	JIL7	CHEEP	SING	THEE	GILT
BANK	MET	THAD	TENT	DANK	NET	FAD	PENT
GOT	CAUGHT	FOP	WALL	DOT	TAUGHT	HOP	YAWL
ROSE	RUDE	NODE	NOOSE	NOSE	NUDE	RODE	ROOSE
DINT	PEEN	CHIN	VEAL	TINT	BEAN	GIN	PEEL
NECK	MAD	BEND	DAB	DECK	BAD	MEND	NAB
THONG	80×	CHAW	VON	TONG	VOX	SHAW	BON
CHEM	JOE	GONSE	THOLE	con	GO	JUICE	SOLE
WEED	BID	TEAK	THIN	REED	DID	PEEK	FIN
SAG	YEN	GAT	PEG	SHAG	WREN	BAT	KEG
ROB	NOUGHT	NOT	RAW	KNOB	WROUGHT	ROT	GNAW
POAL	200	GOAT	TUNE	VOLE	SUE	COAT	DUNE
NIP	DEED	BIT	MEET	DIP	NEED	MIT	BFET
PENCE	THAN	DEN	CHAD	PENCE	DAN	THEN	SHAD
THAM	CHOP	JAWS	GOT	SAH	COP	GAUZE	JOT
POOL	THOR	NOON	BOWL	TOOL	FORE	MOON	DOLE
YIELD	FIT	TEA	GILL	WIELD	HIT	KEY	DILL
RAT	NEST	NAP	RED	GNAT	REST	RAP	NED

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A08	CDOT	PEST	PAN	608	TOOT	TEST	FAN
DAUNT	BOND	FAULT	CHOCK	TAUNT	POND	VAULT	JOCK
HOOT	BONE	DUES	NOTE	600T	MOAN	NEWS	DOTE
CHEAT	BILL	VEE	THICK	SHEET	VILL	BEE	TICK
JAB	JEST	THANK	CARE	GAB	GUEST	SANK	CHAIR
TOT	THOUGHT	WAD	BONG	POT	FOUGHT	ROD	DONG
BOAST	POOP	SHOW	YOU	GHOST	COOP	80	RUE
*ILL	REAP	NIP	NEATH	NILL	NEAP	RIP	WREATH
720	FAST	TENSE	GAFF	SAID	VAST	DENSE	CALF
GNAM	DOCK	808\$	HOM	DAW	KNOCK	M083	BOMB
CHODSE	THOSE	FOO	DOUGH	SHOES	DOZE	POOH	THOUGH
KEEP	THING	ZEF	JILT	CHEEP	SING	THEE	GILT
DANK	MET	FAD	TENT	BANK	NET	THAD	PENT
DOT	CAUGHT	HOP	WALL	FOT	TAUGHT	FOP	YAWL
NOSE	NUDE	RODE	ROOSE	ROSE	RUDE	NBDE	NOOSE
DINT	PEEN	CHIN	VEAL	TINT	BEAN	GIN	FEEL
DECK	BAD	HEND	NAB	NECK	MAD	BEND	DAB
THONG	VOX	CHAW	BON	TONG	BOX	SHAW	VON
CHEM	.10E	GONSE	THOLE	COO	GO	JUICE	SOLE
REED	BID	PEEK	THIN	WEED	DID	TEAK	FIN
SHAG	YEN	BAT	PEG	SAG	WREN	GAT	KEG
KNOB	WROUGHT	ROT	GNAH	ROB	NOUGHT	NOT	RAW
VOLE	\$∪E	COAT	DUNE	FOAL	Z00	GOAT	TUNE
DIP	NEED	MIT	BEET	NIP	DEED	BIT	MEET
PENCE	THAN	THEN	CHAD	FENCE	DAN	DEN	SHAD
THAN	COP	JAHT	JOT	SAW	CHOP	GAUZE	GOT
TOOL	THOR	MOON	BOHL	POOL	FORE	NOON	DOLE
HIELD	HIT	KEY	DILL	YIELD	FIT	TEA	GILL
RAT	REST	NAP	NED	GNAT	NEST	RAP	RED

PAGE 1		PAGE 2		PAGE	PAGE 3		PAGE 4	
808	COOT	PEST	PAN	GOR	TOOT	TEST	FAN	
DAUNT	BOND	PAULT	CHOCK	TAUNT	POND	VAULT	JOCK	
BOOT	MOAN	NEWS	DOTE	MOOT	BONE	DUES	NOTE	
CHEAT	BILL	VEE	THICK	SHEET	VILL	BEE	TICK	
GAB	JEST	BANK	CARE	JAB	GUEST	THANK	CHAIR	
TOT	THOUGHT	WAD	BONG	POT	FOUGHT	ROD	DONG	
BOAST	COOP	SHOW	RUE	CHOST	POOP	50	YOU	
RILL	NEAP	NIP	WREATH	NILL	REAP	RIP	NEATH	
SAID	FAST	DENSE	GAFF	ZED	VAST	TENSE	CALF	
GNAW	DOCK	8088	МОМ	DAW	KNOCK	MOSS	80MB	
SHOES	THOSE	POOH	DOUGH	CHOOSE	DOZE	F00	THOUGH	
CHEEP	THING	THEE	JILT	KEEP	SING	ZEE	GILT	
DANK	MET	FAD	TENT	BANK	NET	CAHT	PENT	
GOT	CAUGHT	FO	WALL	DOT	TAUGHT	HOP	YAWL	
NOSE	NUDE	*O	ROOSE	ROSE	RUDE	NODE	HOOSE	
TINT	BEAN	BIN	FEEL	DINT	PEEN	CHIN	VEAL	
DECK	MAD	MEND	DAB	NECK	BAD	BEND	NAB	
THONG	VOX	CHAW	BON	TONG	60x	SHAH	VON	
CHEW	JOÉ	GOOSE	THOLE	C00	GO	JUICE	SOLE	
REED	810	PEEK	THIN	WEED	DID	TEAK	FIN	
SHAG	YEN	BAT	PEG	SAG	WREN	GAT	KEG	
ROB	HROUGHT	TCH	GNAW	KNOB	NOUGHT	ROT	RAW	
VOLE	200	COAT	TUNE	FOAL	SUE	GOAT	DUNE	
NIP	NEED	BIT	BEET	DIP	DEED	HIT	MEET	
PENCE	DAN	THEN	SHAD	FENCE	THAN	DEN	CHAD	
THAN	COP	JAWS	JOT	SAH	CHOP	GAUZE	GOT	
	THOR	MOON	BOWL	PODL	FORE	NOON	DOLE	
TOOL WIELD	HIT	KEY	DILL	YIELD	FIT	TEA	GILL	
MAT	NEST	NAP	RED	GNAT	REST	RAP	NED	

PAGE	1	PAGE Q		PAGE	3	PAGE 4	
GOB	COOT	TEST	PAN	808	T00T	PEST	FAN
TAUNT	BOND	VAULT	CHOCK	DAUNT	POND	PAULT	JOCK
BOOT	BONE	NEWS	NOTE	HOOT	MOAN	DUES	DOTE
CHEAT	BILL	VEE	THICK	SHEET	VILL	BEE	TICK
JAB	GUEST	THANK	CHAIR	GAB	JEST	SANK	CARE
TOT	FOUGHT	WAD	DONG	POT	THOUGHT	ROD	BONG
BOAST	POOP	SHOW	YOU	GHDST	COOP	30	RUE
NILL	REAP	RIP	NEATH	RILL	NEAP	NIP	WREATH
SAID	FAST	DENSE	GAFF	760	VAST	TENSE	CALF
GNAW	KNOCK	8088	BONB	DAW	DOCK	MOSS	MOM
SHOES	THOSE	POOH	DOUGH	CHOOSE	DOZE	F00	THOUGH
KEEP	SING	252	GILT	CHEEP	THING	THEE	JILT
DANK	NET	FAD	PENT	BANK	MET	THAD	TENT
GOT	TAUGHT	FOP	YAWL	DOT	CAUGHT	HOP	WALL
ROSE	NUDE	NODE	ROOSE	NOSE	RUDE	RODE	NOOSE
DINT	PEEN	CHIN	VEAL	TINT	BEAN	GIN	FEEL
DECK	BAD	MEND	NAB	NECK	MAD	BEND	DAB
THONG	VOX	CHAW	BON	TONG	BOX	SHAW	VON
CHEM	JOE	GOOSE	THOLE	can	GO	JUICE	SOLE
MEED	010	TEAK	FIN	PEED	BID	PEEK	THIN
SHAG	HREN	BAT	KEG	SAG	YEN	GAT	PEG
KNOB	NOUGHT	ROT	RAW	ROB	WROUGHT	NOT	GNAW
FOAL	SUE	GOAT	DUNE	VOLE	200	COAT	TUNE
DIP	NEED	MIT	BEET	NIP	DEED	811	HEET
PENCE	DAN	THEN	SHAD	FENCE	THAN	DEN	CHAD
THAN	CHOP	JAHS	GOT	SAW	COP	GAUZE	JOT
POOL	FORE	NOON	DOLE	TOOL	THOR	MOON	BOHL
YIELO	FIT	TEA	GILL	HIELD	HIT	KEY	DILL
RAT	REST	NAP	NED	GNAT	NEST	RAP	RED

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PAGE 1		PAGE 2		PAGE 3		PAGE 4	
		PEST	FAN	608	COOT	TEST	PAN
ROB	T00T	VALLT	Jock	DAUNT	BOND	FAULT	CHOCK
TAUNT	POND	NEWS	NOTE	HOOT	MOAN	DUES	DOTE
BOOT	BONE	· -	TICK	CHEAT	BILL	VEE	THICK
SHEET	VILL	BEE	CARE	GAB	GUEST	SANK	CHAIR
JAB	JEST	THANK	DONG	TOT	THOUGHT	WAD	BONG
POT	FOUGHT	ROD	70U	POAST	COOP	SHOW	RUE
GHOST	POOP	Sn ST	NEATH	PILL	NEAP	NIP	WREATH
NTLL	REAP	RIP	CALF	750	FAST	TENSE	GAFF
SAID	VAST	DENSE	HOM	GNAW	KNOCK	8033	8 0 M B
DAW	DOCK	MO53	DUNGH	SHOES	DOZE	POOH	THOUGH
CHOOSE	THOSE	FOO	GILT	KEEP	THING	ZEE	JILT
CHEEP	SING	THEE	PENT	DANK	MET	FAD	TENT
BANK	NET	THAD	_	005	TAUGHT	HOP	YAWL
GOT	CAUGHT	FOP	WALL	NOSE	RUDE	RODE	NOOSE
RO\$ E	NUDE	NODE	ROOSE	TINT	PEEN	GIN	VEAL
DINT	BEAN	CHIN	FEEL	DECK	MAD	MEND	DAB
NECK	8 A D	BEND	NAB	TONG	BOX	SHAR	VON
THONG	V O X	CHAH	BON	CHEW	Gn	GOOSE	SOLF
C00	JUE	JUICE	THOLE	MEED	610	TEAK	THIN
REED	010	PEEK	FIN	SAG	YEN	GAT	PEG
SHAG	WREN	PAT	KFG	FNOR	WROUGHT	ROT	GNAW
ROB	MNUGHT	NOT_	RAW		200	COAT	TUNE
FOAL	\$∪ E	GOAT	DUNF	VOLE	NEED	BIT	BEET
DIP	DEED	MIT	MEET	NIP	THAN	THEN	CHAD
FENCE	DAN	DEN	SHAD	PENCE	COP	JAWS	JnT
SAW	CHOP	GAUZE	GOT	THAN	_	MOON	BONL
POOL	FORE	NOON	UPLE	TOOL	THOR	TEA	DILL
WIELD	FIT	KEY	GILL	YIFLD	HIT	RAP	NED
RAT	NEST	NAP	RED	GNAT	REST	RAF	

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GOB	COOT	TEST	PAN	ROR	TOOT	PEST	FAN
TAUNT	BOND	VAULT	CHOCK	DAUNT	POND	FAULT	JOCK
BOOT	MOAN	NEWS	DOTE	MODIT	BONE	DUES	NOTE
SHEET	VILL	BEF	TTCF	CHEAT	BTLL	VEE	THICK
BAL	GUEST	THANK	CHATR	GAP	JEST	SANK	CARE
POT	THOUGHT	ROP	BONG	TOT	FOUGHT	MAD	DONG
BOAST	COOP	SHOW	RliE	GHOST	POOP	sn	YOU
PILL	REAP	NIP	NEATH	NILL	NEAP	RIP	WREATH
SAID	FAST	DENSE	GAFF	7ED	VAST	TENSE	CALF
GNAW	KNOCK	8055	BOMB	DAW	DOCK	MOSS	MOH
SHOES	DOZE	POCH	THOUGH	CHOOSE	THOSE	FOO	DOUGH
CHEEP	SING	THEE	GILT	KEFP	THING	ZEE	JILT
PANK	HET	THAD	TENT	DANK	NET	FAD	PENT
GOT	CAUGHT	FOP	⇒ A L 1	POT	TAUGHT	HÔP	YANL
NOSE	RUDE	RODE	NOOSE	ROSE	NUOF	NODE	ROOSE
DINT	PEEN	CHIN	VFAL	TINT	BFAN	GIN	FEEL
NECK	MAD	REND	DAR	PECK	HAD	MEND	NAB
THONG	R O Y	CHAW	VCN	TONG	VOX	SHAW	BON
600	Gn	JUICE	SOLE	CHEW	JOF	GOOSE	THOLE
WEFD	סוס	TEAK	FIN	REED	BID	PEEK	THIN
SAG	YEN	GAT	PEG	SHAG	WREN	BAT	KEG
KNOB	MOUGHT	POT	RAW	ROH	WROUGHT	NOT	GNAW
FOAL	200	GOAT	THNE	VOLE	SHE	COAT	DUNE
NIP	NEED	PIT	HFET	PIP	DEED	MIT	MEET
PENCE	THAN	THEN	CHAD	FENCE	DAN	DEN	SHAD
SAN	CUB	GAUZE	JnT	THAW	CHOP	JAWS	GDT
90 01	FORF	NOON	DOLE	TOOL	THOR	MOON	BOWL
WIELD	FTT	KEY	GTLI	YIFLO	HIT	TEA	DILL
GNAT	NEST	PAP	RED	PAT	REST	NAP	NEO

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608	COOT	TEST	PAN	808	TOST	PEST	FAN
DAUNT	POND	FAULT	JOCK	TAUNT	BOND	VAULT	CHOCK
MOOT	BONE	DUES	NOTE	BOOT	MOAN	NEWS	DOTE
CHEAT	BILL	VEE	THICK	SHEET	VILL	BEE	TICK
JAB	JEST	THANK	CARE	GAB	GUEST	SANK	CHAIR
TOT	THOUGHT	WAD	BONG	POT	FOUSHT	ROD	DONG
GHOST	COOP	80	RUE	BCAST	POOP	SHOW	YOU
NILL	REAP	RIP	NEATH	FILL	NEAP	NIP	WREATH
	VAST	TENSE	CALF	SAID	FAST	DENSE	GAFF
7ED	KNOCK	8035	воне	DAH	DOCK	H088	MOM
GNAR	DOZE	FOR	THOUGH	SHOES	THOSE	POOH	DOUGH
CHOOSE	SING	786	GILT	CHEEP	THING	THEE	JILT
KEEP	MET.	FAD	TENT	PANK	NET	THAD	PENT
DANK	CAUGHT	HOP	WALL	607	TAUGHT	FOP	YAHL
DOT		RODE	ROOSE	POSE	RUDE	NODE	NOOSE
NOSE	NUDE	GIN	FEEL.	DINT	PEEN	CHIN	VEAL
TINT	8 E A N	_	NAB	DECK	MAD	HEND	DAB
NECK	BAD	BEND	BON	THONG	BCX	CHAW	VON
TONG	VOX	SHAW		000	JOE	JUICE	THOLE
CHEM	60	GOOSE	SOLE	WEED	910	TEAK	THIN
REED	010	PEFK	PIN		YEN	GAT	PEG
SHAG	HREN	BAT	KEG	SAG Knob	WROUGHT	ROT	GNAW
ROB_	THRUCH	NOT	RAW			GOAT	DUNE
VOLE	200	COAT	TUNE	FOAL	SUE	817	HEET
DIP	NEED	HIT	BEET	NIP	DEED		SHAD
FENCE	THAN	DEN	CHAD	PENCE	DAN	THEN	GOT
SAW	COP	GAUZE	JOT	THAM	CHOP	JAWS	
POOL	THOR	NDON	BOWL	TOOL	FORE	MOON	DOLE
WIELD	FIT	KEY	GILL	AIEFD	HIT	TEA	DILL
RAT	NEST	NAP	RED	GNAT	REST	RAP	NED

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808	TOOT	PEST	PAN	608	CODT	TEST	PAN
DAUNT	BOND	FAULT	CHOCK	TAUNT	POND	VAULT	JOCK
HOOT	MOAN	DUES	DOTE	BOOT	BONE	NEWS	NOTE
CHEAT	VILL	VEE	TICK	SHEET	BILL	330	THICK
JAB	JEST	THANK	CARE	GAB	GUEST	SANK	CHAIR
POT	THOUGHT	RUD	BONG	TOT	POUGHT	MAD	DONG
GHOST	COOP	30	RUE	ROAST	POOP	SHOW	YOU
NILL	NEAP	RIP	WREATH	RILL	REAP	NIP	NEATH
SAID	VAST	DENSE	CALP	ZED	FAST	TENSE	GAFF
GNAH	KNOCK	8055	BOMB	DAH	DOCK	M033	MOH
CHOOSE	DOZE	FOO	THOUGH	SHOES	THOSE	POOH	DOUGH
CHEEP	8 I N G	THEE	GILT	KEEP	THING	266	JILT
BANK	MET	THAD	TENT	DANK	NET	PAD	PENT
GOT	CAUGHT	FOP	WALL	DOT	TAUGHT	HOP	YAWL
ROSE	RUDE	NODE	NOOSE	NOSE	NUDE	RODE	ROOSE
DINT	PEEN	CHIN	VEAL	TINT	BEAN	GIN	PEEL
DECK	MAD	MEND	DAB	NECK	BAD	BEND	NAB
THONG	VOX	CHAW	BON	TONG	BOX	SHAW	VON
CHEM	JOE	GOOSE	THOLE	CON	GN	JUICE	SOLE
MEED	DID	TEAK	PIN	REED	BID	FEEK	THIN
8 A G	YEN	GAT	PEG	SHAG	WREN	BAT	KEG
KNOB	WROUGHT	ROT	GNAW	R 0 6	NOUGHT	NOT	RAW
FOAL	200	GOAT	TUNE	VOLE	SUE	CDAT	DUNE
DIP	DEED	HIT	MEET	NIP	NEED	BIT	BEET
FENCE	DAN	DEN	SHAD	PENCE	THAN	THEN	CHAD
SAH	COP	GAUZE	JOT	THAN	CHOP	JAWS	GOT
TOOL	THOR	MOON	BOWL	POOL	FORE	NOON	DOLE
YIELD	FIT	TEA	GILL	WIELD	HIT	KEY	DILL
GNAT	NEST	RAP	RED	RAT	REST	NAP	NED

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PAGE	1	PAGE 2		PAGE 3		PAGE 4	
GOB	TOOT	TEST	FAN	808	COOT	PEST	PAN
DAUNT	POND	FAULT	JOCK	TAUNT	BOND	VAULT	CHOCK
HOOT	MOAN	DHES	DOTE	ROOT	BONE	NEW8	NOTE
SHEET	VILL	REE	TICK	CHEAT	BILL	VEE	THICK
GAB	JEST	SANK	CARE	JAR	GUEST	THANK	CHAIR
TOT	THOUGHT	WAD	BONG	POT	FOUGHT	ROD	DONG
BOAST	POOP	8H()H	YOU	GHDST	COOP	30	RUE
FILL	NEAP	NIP	WREATH	NILL	REAP	RIP	NEATH
ZED	VAST	TENSE	CALF	SAID	FAST	DENSE	GAFF
DAW	DOCK	M055	МОМ	GNAW	KNOCK	8083	8048
SHOES	DOZE	POOH	THOUGH	CHOOSE	THOSE	F00	DOUGH
CHEEP	THING	THEE	JILT	KEEP	SING	ZEE	GILT
DANK	MET	FAD	TENT	RANK	NET	THAD	PENT
GOT	CAUGHT	FOP	WALL	DOT	TAUGHT	HOP	YAWL
NOSE	RUDE	RODE	NOOSE	ROSE	NUDE	NODE	ROOSE
DINT	BEAN	CHIN	FFEL	TINT	PEEN	GIN	VEAL
NECK	MAD	BEND	DAB	DECK	BAD	MEND	NAB
THONG	VOX	CHAH	BON	TONG	BOX	SHAW	VON
CHEH	JÖE	GOOSE	THOLE	COO	GO	JUICE	SOLE
REED	DID	PEEK	FIN	WEED	BID	TEAK	THIN
SAG	YEN	GAT	PEG	SHAG	WREN	BAT	KEG
KNDB	NOUGHT	ROT	RAH	ROR	WROUGHT	NOT	GNAH
FDAL	200	GDAT	TUNF	VOLE	3 ∪€	COAT	DUNE
NIP	DEED	BIT	HEET	DIP	NEED	MIT	BEET
PENCE	THAN	DEN	CHAD	PENCF	DAN	THEN	SHAD
SAH	CHUP	GAUZE	GNT	THAM	COP	JAWS	TOL
TOOL	FORE	MOON	DOLE	POOL	THOR	NDGN	BOWL
VIELD	HIT	TEA	DILL	WIFLD	FIT	KEY	GILL
PAT	REST	NAP	NED	GNAT	NEST	RAP	RED

WORD LIST

PAGE	1	PAGE P		PAGE 3		PAGE 4	
808	C007	PEST	PAN	GOR	TOOT	TEST	FAN
BAUNT	POND	FAULT	JOCK	TAUNT	BOND	VAULT	CHOCK
HOOT	BONE	DUES	NOTE	ROOT	MOAN	HENS	DOTE
SHEET	BILL	BEE	THICK	CHEAT	VILL	VEE	TICK
GAB	JEST	SANK	CARE	JAR	GUEST	THANK	CHAIR
POT	FOUGHT	ROD	DONG	TOT	THOUGHT	WAD	BONG
GHDST	POOP	80	YOU	ROAST	COOP	SHOW	RUE
RILL	REAP	NIP	NEATH	NILL	NEAP	RIP	WREATH
SATO	FAST	DENSE	GAFF	760	VAST	TENSE	CALP
DAW	DOCK	MDSS	MOM	GNAH	KNOCK	8088	BOHB
CHOOSE	THOSE	FOO	DOUGH	SHOES	DOZE	P00H	THOUGH
CHEEP	THING	THEE	JILT	KEEP	SING	ZEE	GILT
RANK	MET	THAD	TENT	DANK	NET	FAD	PENT
DOT	TAUGHT	HOP	YAWL	GOT	CAUGHT	FOP	WALL
NOSE	RUDE	RODE	NOOSE	ROSE	NUDE	NODE	ROOSE
DINT	PEEN	CHIN	VEAL	TINT	BEAN	GIN	FEEL
NECK	MAD	BEND	DAB	PECK	BAD	MEND	NAB
THONG	BCX	CHAH	VON	TONG	VOX	SHAW	BON
coo	GO	JUICE	SOLE	CHEW	JOE	GDOSE	THOLE
WEED	DID	TEAK	FIN	REFO	BID	PEEK	THIN
SHAG	WREN	BAT	KFG	SAG	YEN	GAT	PEG
ROB	WROUGHT	NOT	GNAM	KNOB	NOUGHT	ROT	RAW
VOLE	8UE	COAT	DUNE	FOAL	200	GOAT	TUNE
NIF	DEED	817	MEET	DIP	NEED	MIT	BEET
PENCE	THAN	THEN	CHAD	FENCE	DAN	DEN	SHAD
THAM	CHOP	JAHS	FAT	SAW	COP	GAUZE	JOT
TOOL	FORE	HODN	DOLE	POOL	THER	NOON	BOWL
WIELD	HIT	KEY	DILL	VIELD	FIT	TEA	GILL
RAT	REST	NAP	NED	GNAT	NEST	RAP	RED

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DAUNT	BOND	FAULT	CHOCK	TAUNT	POND	VAULT	JOCK
MOOT	MOAN	DUES	DOTE	BOOT	BONE	NEWS	NOTE
CHEAT	BILL	VEF	THICK	SHEET	VILL	BEF	TICK
JAB	GUEST	THANK	CHAIR	GAB	JEST	SANK	CARE
TOT	FOUGHT	WAD	DONG	POT	THOUGHT	ROD	BONG
BOAST	POOP	8H0H	YOU	GHOST	COOP	\$0	RUE
RILL	NEAP	NIP	MREATH	NILL	REAP	RIP	NEATH
ZED	VAST	TENSE	CALF	SAID	PAST	DENSE	GAFF
DAN	DOCK	HOSS	MOH	GNAW	KNOCK	8033	BOMB
SHOES	DOZE	POOH	THOUGH	CHOOSE	THOSE	FOO	DOUGH
KEEP	THING	ZEE	JILY	CHEEP	SING	THEE	GILT
DANK	NET	FAD	PENT	BANK	MET	THAD	TENT
GOT	TAUGHT	POP	YAML	DOT	CAUGHT	HOP	WALL
NOSE	RUDE	RODE	NODSE	ROSE	NUDE	NODE	ROOSE
TINT	PEEN	GIN	VEAL	DINT	BEAN	CHIN	FEEL
HECK	BAD	BEND	NAB	DECK	MAD	MEND	DAB
THONG	VOX	CHAW	BON	TONS	80x	SHAW	VON
COO	JOE	JUICE	THOLE	CHEN	GO	600\$£	SOLE
REED	010	PEEK	FIN	WEED	810	TEAK	THIN
SAG	YEN	GAT	PEG	SHAG	WREN	BAT	KEG
KNOB	HROUGHT	ROT	GNAW	ROR	HOUGHT	NOT	RAW
FOAL	SUE	GOAT	DUNE	VOLE	200	COAT	TUNE
DIP	NEED	MIT	BEET	NIP	DEED	BIT	HEET
PENCE	DAN	DEN	SHAD	PENCE	THAN	THEN	CHAD
SAW	COP	GAUZE	Int	THAN	CHOP	JAWS	GOT
TOOL	FORE	MOON	DOLE	POOL	THOR	NOON	BOWL
YIELD	HIT	TEA	DILL	WIELD	FIT	KEY	GILL
RAT	NEST	NAP	RED	GNAT	REST	RAP	NED

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908	0007	PEST	PAN	GOB	TOOT	TEST	FAN
TAUNT	POND	VAULT	JOCK	DAUNT	BOND	PAULT	CHOCK
BOOT	BONE	NEWS	NOTE	MODT	HOAN	DUES	DOTE
SHEET	BILL	BEF	THICK	CHEAT	VILL	VEE	TICK
JAB	GUEST	THANK	CHAIR	GAB	TEST	SANK	CARE
PCT	FOUGHT	P00	DONG	TOT	THOUGHT	WAD	BONG
BOAST	C00P	SHOW	RUE	GHOST	POOP	30	YOU
NILL	REAP	RIP	NEATH	RILL	NEAP	NIP	HREATH
SAID	FAST	DENSE	GAFF	ZED	VAST	TENSE	CALP
DAN	KNOCK	MOSS	BAHB	GNAW	DOCK	8035	MON
SHOES	THOSE	POOH	DOUGH	CHOOSE	DOZE	FOO	THOUGH
CHEEP	SING	THEE	GILT	KEEP	THING	ZEE	JILT
BANK	MET	THAD	TENT	DANK	NET	FAD	PENT
DOT	TAUGHT	HOP	YAML	607	CAUGHT	POP	WALL
ROSE	NUDE	NODE	ROOSE	NOSE	RUDE	RODE	NOOSE
DINT	BEAN	CHIN	PEEL	TINT	PEEN	GIN	VEAL
NECK	BAD	BEND	NAB	DECK	MAD	MEND	DAB
TONG	VOX	SHAW	BON	THONG	8 ft X	CHAH	VON
000	JOE	JUICE	THOLE	CHEW	GO	GOOSE	SOLE
WEED	810	TEAK	THIN	REFO	010	PEEK	FIN
SHAG	HREN	BAT	KEĞ	SAG	YEN	GAT	PEG
ROB	WROUGHT	NOT	GNAW	KNOB	NOUGHT	ROT	RAW
VOLE	SUE	COAT	DUNE	FOAL	200	GOAT	TUNE
DIP	DEED	MIT	HEET	NIP	NEED	BIT	BEET
PENCE	THAN	THEN	CHAD	FENCE	DAN	DEN	SHAD
THAM	CHOP	JANS	GnT	SAN	COP	GAUZE	JOT
TOOL	FORE	MOON	DOLE	PODL	THOR	NOON	BONL
WIELD	HIT	KEY	DILL	YIELD	FIT	TEA	GILL
RAT	REST	NAP	NED	GNAT	NEST	RAP	RED

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PAGE	1	PAGE	2	PAGE	3	PAGE	4
808	COOT	PEST	PAN	GDB	T00T	TEST	FAN
TAUNT	POND	VAULT	JOCK	DAUNT	BOND	PAULT	CHOCK
B00T	BONE	NEWS	NOTE	MOOT	MOAN	DUES	DOTE
SHEET	BILL	BEE	THICK	CHEAT	VILL	VEE	TICK
JAR	JEST	THANK	CARE	GAB	GUEST	SANK	CHAIR
TOT	THOUGHT	WAD	BONG	POT	FOUGHT	ROD	DONG
BOAST	COOP	SHOW	RUE	GHOST	POOP	30	YOU
NILL	REAP	RIP	NEATH	RILL	NEAP	NIP	WREATH
ZED	VAST	TENSE	CALF	SATO	FAST	DENSE	GAFF
GNAW	KNOCK	8083	BOMB	DAW	DOCK	M088	HOM
SHOES	DOZE	POOH	THOUGH	CHOOSE	THOSE	P00	DOUGH
KEEP	THING	ZEE	JILT	CHEEP	SING	THEE	GILT
DANK	MET	FAD	TENT	BANK	NET	THAD	PENT
DOT	CAUGHT	HOP	WALL	BOT	TAUGHT	POP	YAWL
ROSE	RUDE	NODE	NOOSE	NOSE	NUDE	RODE	ROOSE
TINT	BEAN	GIN	PEEL	DINT	PEEN	CHIN	VEAL
DECK	8 4 0	MEND	NAB	NECK	MAD	BEND	DAB
THONG	BOX	CHAW	VON	TONG	VOX	SHAW	BON
CHEH	GO	GODSE	BOLE	000	JO€	JUICE	THOLE
REED	BIO	PEFK	THIN	NEED	DID	TEAK	FIN
SAG	YEN	GAT	PEG	SHAG	HREN	BAT	KEG
KNOB	HROUGHT	ROT	GNAH	ROB	NOUGHT	NOT	RAW
FOAL	SUE	GOAT	DUNE	VOLE	200	COAT	TUNE
DIP	DEED	MIT	MEET	NIP	NEED	BIT	BEET
PENCE	DAN	DEN	SHAD	PENCE	THAN	THEN	CHAD
SAW	CHOP	GAUZE	GOT	THAW	COP	ZWS	JOT
PODL	FORE	NOON	DOLE	TOOL	THOR	MOON	BOWL
YIELD	FIT	TEA	GTLL	WIELD	HIT	KEY	DILL
RAT	NEST	NAP	RED	GNAT	REST	RAP	NED

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PAGE	1	PAGE	2	PAGE	3	PAGE	4
608	CODT	TEST	PAN	808	T00T	PEST	FAN
TAUNT	BOND	VAULT	CHOCK	DAUNT	POND	FAULT	JOCK
MOOT	BONE	DUES	NOTE	BODT	MDAN	NEWS	DOTE
CHEAT	VILL	VÉE	TICK	SHEET	BILL	858	THICK
GAB	JEST	SANK	CARE	JAR	GUEST	THANK	CHAIR
TOT	THOUGHT	WAD	BONG	POT	FOUGHT	FOD	DONG
PDAST	POOP	8404	Y00	GHOST	COOP	30	RUE
NILL	NEAP	RIP	WREATH	PILL	REAP	NIP	NEATH
ZEO	PAST	TENSE	GAFF	SAID	VAST	DENSE	CALF
GNAU	KNOCK	8083	BAMB	DAH	раск	M033	HOH
SHOES	DOZE	POOH	THOUGH	CHOOSE	THOSE	F 00	DOUGH
KEEP	BING	ZEE	GILT	CHEEP	THING	THEE	JILT
BANK	NET	THAD	PFNT	DANK	MET	FAD	TENT
GOT	TAUGHT	FOP	YAWL	POT	CAUGHT	HOP	WALL
ROSE	RUDE	NODE	NOOSE	NOSE	NUDE	RODE	ROOSE
DINT	PEEN	CHIN	VEAL	TINT	BEAN	GIN	FEEL
NECK	BAD	BEND	NAB	DECK	MAD	MEND	DAB
TONS	BOX	SHAH	VON	THONG	VOX	CHAW	BON
CHEM	60	GODSE	SOLE	r.00	JOE	JUTCE	THOLE
REED	DID	PEEK	PIN	WEED	810	TEAK	THIN
SAG	YEN	GAT	PEG	SHAG	WREN	BAT	KEG
KNOB	HROUGHT	ROT	GNAW	# O B	NOUGHT	NOT	RAH
VOLE	ZOO	COAT	TUNE	FOAL	SUE	GOAT	DUNE
DIP	NEED	MIT	BEET	NIP	DEED	BIT	MEET
PENCI	TKAN	THEN	CHAD	FENCE	DAN	DEN	SHAD
THAH	COP	JAHS	JOT	SAN	CHOP	GAUZE	GOT
POOL	THOR	NODN	BOWL	TOOL	FORE	MOON	DOLE
YIELD	AIT	TEA	DILL	WIELD	FIT	KEY	GILL
RAT	REST	NAP	NED	GNAT	NEST	RAP	REO

WORD LIST

PAGE	1	PAGE	. 5	PAGF	3	PAGE	4
GOS	TOOT	TEST	FAN	808	COOT	PEST	PAN
DAUNT	POND	FAULT	JOCK	TAUNT	BOND	VAULT	CHOCK
HODY	MOAN	DUES	DOTE	ROOT	BONE	NEW8	NOTE
CHEAT	BILL	VEE	THICK	SHEET	VILL	BEE	TICK
GAB	JEST	SANK	CARE	JAB	GUEST	THANK	CHAIR
TOT	FOUGHT	WAD	DONG	POT	THOUGHT	ROD	BONG
BOAST	POOP	SHOW	YOU	GHOST	COOP	80	RUE
RILL	NEAP	NIP	WREATH	NILL	REAP	RIP	NEATH
ZED	FAST	TENSE	GAFF	SAID	VAST	DENSE	CALF
GNAH	KNOCK	8083	BOMB	DAW	DOCK	MOSS	MOM
SHOES	DOZE	POOH	THOUGH	CHOOSE	THOSE	FOR	DOUGH
KEEP	THING	ZEE	JILT	CHEEP	SING	THEE	GILT
DANK	NET	FAD	PENT	BANK	MET	THAD	TENT
GOT	TAUGHT	FOP	YAWL	DOT	CAUGHT	HOP	WALL
NOSE	RUDE	PODE	NOOSE	ROSE	NUDE	NODE	ROOSE
DINT	BEAN	CHIN	PEEL	TINT	PEEN	GIN	VEAL
DECK	BAD	HEND	NAB	NECK	NAD	BEND	DAB
THONG	VOX	CHAN	BON	TONG	BOX	SHAW	VON
coo	JOE	JUICE	THOLE	CHEW	GO	GOOSE	SOLE
RFED	010	PEEK	FIN	WEED	810	TEAK	THÍN
SHAG	WREN	BAT	KEG	8 A G	YEN	GAT	PEG
KNOB	NOUGHT	ROT	RAW	ROB	WROUGHT	NOT	GNAW
VOLE	BUE	COAT	DUNE	FOAL	700	GOAT	TUNE
DIP	DEED	MIT	MEET	NIP	NEED	BIT	BEET
PENCE	THAN	THEN	CHAD	FENCE	DAN	DEN	SHAD
SAW	CHOP	GAUZE	GOT	THAW	COP	JAWS	JOT
TOOL	THOR	MOON	BOWL	PONL	FORE	NOON	DOLE
HIELD	HIT	KEV	DILL	YIFLD	FIT	TEA	GTLL
RAT	NEST	NAP	RFD	GNAT	REST	RAP	NED

WORD LIST 3178

PAGE	1	PAGE	2	PAGE	3	PAGE	4
608	CDOT	TEST	PAN	808	TOOT	PEST	FAN
TAUNT	BOND	VAULT	CHOCK	DAUNT	POND	FAULT	JOCK
HOOT	MDAN	DUES	DOTE	ROOT	BONE	NEWS	NOTE
CHEAT	VILL	VEE	TICK	SHEET	BILL	338	THICK
JAB	JEST	THANK	CARE	GAB	GUEST	BANK	CHAIR
TOT	THOUGHT	WAD	BONG	POT	FOUGHT	ROD	DONG
BOAST	POOP	SHOW	YOU	GHOST	COOP	80	RUE
RILL	NEAP	NIP	NPEATH	NILL	REAP	RIP	NEATH
SAID	VAST	DENSE	CALF	ZED	FAST	TENSE	GAFF
DAW	KNOCK	M088	BOMB	GNAW	DOCK	8088	HOM
SHOES	THOSE	PODH	DOUGH	CHOOSE	DOZE	F00	THOUGH
CHEEP	THING	THEE	JILT	KEEP	SING	ZEE	SILT
DANK	MET	FAD	TENT	BANK	NET	THAD	PENT
GOY	CAUBHT	FOP	WALL	007	TAUGHT	HOP	YAWL
ROSE	RUDE	NODE	NOOSE	NOSE	NUDE	RODE	RODSE
TINT	PEEN	GIN	VEAL	DINT	BEAN	CHIN	FEEL
NECK	BAD	REND	HAB	DECK	HAD	MEND	DAB
TONG	V O X	SHAW	80N	THONG	BOX	CHAW	VON
CHEW	JOE	GOOSE	THOLE	600	90	JUICE	SOLE
REED	810	PEEK	THIN	WEED	DID	TEAK	FIN
SAG	WREN	GAT	KEG	SHAG	YEN	BAT	PEG
ROB	NOUGHT	NOT	# AW	KNOB	HROUGHT	ROT	GNAW
FOAL	SUE	GOAT	DUNE	VOLE	700	COAT	TUNE
NIP	NEED	BIT	BEET	nip	DEED	MIT	MEET
PENCE	DAN	THEN	SHAD	FENCE	THAN	DEN	CHAD
THAM	CHOP	JAWS	GOT	SAW	COP	GAUZE	JOT
TOOL	FORE	MOON	DOLE	POOL	THOR	NOON	BOWL
WIELD	FIT	KEY	GILL	YIELO	HIT	TEA	DILL
GNAT	REST	RAP	NED	RAT	NEST	NAP	RED

WORD LIST

PAGE 1		PAGE 2		PAGE 3		PAGE 4	
608	COOT	TEST	PAN	808	TOOT	PEST	FAN
TAUNT	POND	VAULT	JOCK	DAUNT	BOND	FAULT	CHOCK
BOOT	BONE	NEWS	NOTE	HOOT	MOAN	DUES	DOTE
CHEAT	BILL	VEE	THICK	SHEET	VILL	BEE	TICK
GAB	JEST	SANK	CARE	JAB	GUEST	THANK	CHAIR
TOT	FOUGHT	MAD	DONG	POT	THOUGHT	ROD	BONG
GHOST	COOP	80	RUE	BOAST	POOP	SHOW	
NILL	NEAP	RIP	WREATH	RILL	REAP	NIP	YOU Neath
SAID	VAST	DENSE	CALF	ZED	FAST	YENSE	GAFF
DAW	DOCK	MOSS	NOH.	GNAR	KNOCK	8038	
SHOES	THOSE	POOH	DOUGH	CHOOSE	DOZE	F00	BONB
CHEEP	BING	THEE	GILT	KEEP	THING	7 E E	THOUGH
DANK	NET	FAD	PENT	BANK	MET	THAD	JILT
DOT	CAUGHT	HOP	HALL	GOT	TAUGHT		TENT
ROSE	NUOE	NODE	HOOSE	NOSE	RUDE	FOP	YAHL
DINT	BEAN	CHIN	FEEL	TINT	PEEN	RODE	NOOSE
DECK	MAD	MEND	DAB	NECK	BAD	GIN	VEAL
TONG	BOX	SHAH	VON	THONG	VOX	BEND	NAB
C00	60	JUICE	SOLE	CHEW		CHAN	BON
REED	DID	PEEK	FIN	WEED	JOE	GOOSE	THOLE
84G	YEN	GAT	PEG		BID	TEAK	THIN
KNOB	NOUGHT	ROT	RAW	SHAG	WREN	BAT	KEG
POAL	SUE	GOAT	DUNE	ROB	WROUGHT	NOT	GNAW
NIP	DEED	BIT	MEET	VOLE	200	COAT	TUNE
PENCE	DAN	DEN		DIP	NEED	MIT	BEET
SAH	COP	GAUZE	SHAD	PENCE	THAN	THEN	CHAD
TOOL	THOR		JOT	THAW	CHOP	JAWS	GOT
AIEFD	HIT	MOON	BOWL	POOL	FORE	NOON	DOLE
RAT	_	TEA	DILL	WIELD	FIT	KEY	GILL
7 8 1	REST	NAP	NED	GNAT	NEST	RAP	RED

WORD LIST 3188

PAGE	i	PAGE	2	PAGE	3	PAGE	4
808	TOOT	PEST	FAN	GOR	COOT	TEST	PAN
DAUNT	POND	FAULT	JOCK	TAUNT	BOND	VAULT	CHOCK
BOOT	BONE	NEWS	NOTE	MODT	HOAN	DUES	DOTE
SHEET	VILL	BEE	TICK	CHEAT	BILL	VEE	THICK
GAB	JEST	BANK	CARE	JAB	GUEST	THANK	CHATR
POT	FOUGHT	ROD	DONG	TOT	THOUGHT	WAD	BONG
GHDST	POOP	80	YOU	POAST	COOF	SHOW	RUE
NILL	REAP	RIP	NEATH	RILL	NEAP	NIP	WREATH
ZED	VAST	TENSE	CALF	SAID	FAST	DENSE	GAFF
DAW	DOCK	M085	нон	GNAW	KNOCK	8033	BOMB
SHOES	DOZE	POOH	THOUGH	CHOOSE	THOSE	F00	DOUGH
CHEEP	THING	THEE	JILT	KEEP	SING	ZEE	GILT
DANK	MET	FAD	TENT	BANK	NET	THAD	PENT
GOT	TAUGHT	FOP	YAWL	DOT	CAUGHT	HOP	WALL
ROSE	RUDE	NODE	NOOSE	NOSE	NUDE	RODE	ROOSE
TINT	BEAN	GIN	FEEL	DINT	PEEN	CHIN	VEAL
NECK	BAD	BEND	NAB	DECK	MAD	HEND	DAB
TONG	VOX	SHAW	BAN	THONG	Box	CHAW	VON
COO	JOE	JUICE	THOLE	CHEW	GO	GOOSE	BOLE
REED	010	PEEK	PIN	WEFD	810	TEAK	THIN
SHAG	YEN	BAT	PEG	SAG	WREN	GAT	KEG
KNDB	WROUGHT	ROT	GNAW	ROB	NOUGHT	NOT	RAW
VOLE	Z00	COAT	THAP	FOAL	SUE	GOAT	DUNE
DIP	NEED	MIT	BEET	NIP	DEED	BIT	MEET
FENCE	THAN	DEN	CHAD	PENCE	DAN	THEN	SHAD
THAM	COP	JAHS	JOT	SAW	CHOP	GAUZE	GOT
POOL	THOR	NOON	BOWL	TOOL	FORE	MOON	DOLE
WIELD	HIT	KEY	DILL	YIELD	FIT	TEA	GILL
GNAT	REST	RAP	NED	PAT	NEST	NAP	RED

Appendix B

Diagnostic Rhyme Test Scoring Software and Sample Printout CSP-30 Implementation

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DIAGNUSTIC RHYME TEST SCORING PROGRAM WITH CARTRIDGE OUTPUT
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CSP-30 IMPLEMENTATION

5 MAR 76

FOR INFURMATION CONCERNING THIS PROGRAM CONTACT!

CAPTAIN STEVEN MEISTER ESD/MCE HANSCOM AFB, MA 81731

TELEPHONE: COMM. (617) 861-4433 AUTOVON 478-4433

HRITTEN BY STEVEN MEISTER, ESD/DCWL, HANSCOM AFB, MA Ø1731

NUMBUB # NUMBER OF SUBFEATURES CORRECT EACH LISTENER
NUMT # NUMBER OF MAIN FEATURES CORRECT EACH LISTENER
NUML # NUMBER OF LISTENERS
NUMS # NUMBER OF SPEAKER8
LIST # CURRENT LISTENER
ISPKR # CURRENT SPEAKER
IKEY # CURRENT KEY NUMBER
NKEY # CURRENT KEY INDEX NUMBER FOR KEY ARRAY
IPAGE # PAGE BEING SCORED
IFEAT # INDEX FOR MAIN FEATURE;
1 # VOICING
2 # NASALITY
3 # SUSTENTION
4 # SIBILATION
5 # GRAVENESS
6 # COMPACTNESS
7 # EXPERIMENTAL

FEATURE ARRAY KEYI

PRESENT ABSENT MAIN FEATURE (L,1,1) (L,2,1) L . LISTENER NUMBER (6,1,2) (L,2,2) SUB FEAT PRES SUB FEAT ABS (L,1,3) (L,2,3) FEAT(19,N,M) & MEAN FOR N,M FEAT (20, N, M) & STANDARD ERROR FOR N, M FEAT (18,1,H) . MEAN FOR PRESENT . ABSENT STATE OF M FEAT(18,2,M) = 8.E. FOR PRESENT + AUSENT STATE OF M TOT(1,1) = TOTAL FOR PRESENT STATE ALL FEATURES TOT (2,1) . TOTAL FOR ABBENT STATE ALL FEATURES TOT (3,1) # TOTAL FOR PRESENT + ABSENT ALL FEATURES I = 1 FOR MEAN I = 2 FOR S.E. WHERE

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C
C
         PAGE (I, J, K) AND NPAGE (I, J, K) &
                             I . FEATURE
č
                             J . LIPRESENT
                                              2 I ABSENT
                             K . IIMAIN 213UB PRES 313UB ABS
C
C
         DIMENSION KEY (58,68), KEYSUB (58,2)
         CUMMON IRESP(2,29), VOIC(20,2,3), XNASAL(20,2,3), SUST(20,2,3), SIBIL(20,2,3), GRAV(20,2,3), COMP(20,2,3), EXPER(20,2), TOT(3,2),
      1 1845TE (58) , NAME (12,24) , NPAGE (7,2,3) , PAGE (7,2,3)
Ç
C
          102 A KEY
          DATA KEY/0,0,1,1,0,1,1,0,1,0,1,0,1,1,0,1,4*#,
      1 1,1,10.0,1,1,0,1,3.0,1,0,3.1,6.0,1,1,0,1,0,1,1,8,
C
         1,0,1,1,0,1,0,0,4-1,0,1,0,0,1,3-0,4-1,
      1
         0,1,0,1,1,0,4,0,0,1,1,0,0,1,0,1,1,3*0,1,3*0,1,1,3*0,4*1,6,
C
          103 A KEY
         7+1,3+0,4+1,0,1,1,0,1,2,1,0,0,4+1,0,0,
      1 1,1,0,0,1,1,0,1,1,5=0,1,1,0,1,0,0,3+1,0,1,3+0,1,
C
Ç
          103 8 KEY
         5.1,8,1,1,0,1,0,1,1,0,5.1,0,1,0,4.1,
4.0,1,1,0,1,1,0,0,1,0,0,1,5.0,1,0,1,0,1,0,1,0,0,3.1,0,0,
C
Ç
          104 A KEY
         4.0,1,0,1,0,1,1,0,1,3.0,1,1,0,1,1,0,0,
1,0,0,1,0,0,1,0,1,1,3.0,1,1,0,1,3.0,3.1,0,0,1,0,5.1,3.0,1,
          104 B KEY
C
          5+1,4+0,3+1,0,1,1,0,1,0,4+1,0,0,1,1,
v,n,3+1,0,1,0,4+1,0,1,1,0,1,0,1,0,0,1,5+0,1,0,1,0,
 C
          105 A KEY
 C
          0,3-1,0,0,3-1,0,1,1,0,0,1,1,0,0,1,0,1,0,1,
0,1,0,1,1,0,0,1,0,0,1,1,0,0,1,1,0,10+1,5+0,5+1,
 C
 Ç
          105 B KEY
          0,1,0,4-1,0,1,3-0,3-1,3-8,1,8,1,1,0,1,
       1
          W, 1, 8, 1, 8, 1, 1, 0, 1, 1, 0, 1, 0, 0, 1, 4 · 0, 3 · 1, 0, 1, 1, 9 · 0,
 ¢
 C
           106 A KEY
          A, B, 4+1, B, 1, B, 1, B+B, 3+1, B, 1, B, B, 3+1, B,
 C
           106 8 KEY
          3-1,0,1,0,0,11-1,5-0,1,3-0,1,1,
1,0,1,1,0,1,0,1,0,1,0,1,1,0,1,3-6,1,0,1,1,4-0,1,0,0,
 C
           107 A KEY
           0,1,0,0,1,1,4.0,1,0,0,1,1,4.0,1,0,1,0,0,1,0,3.1,
           0,0,3+1,0,0,1,1,0,0,1,0,4+1,0,3+1,0,0,1,1,0,0,1,1,
 Ç
           107 B KEY
           1,0,1,0,1,1,0,1,1,0,0,1,0,1,0,1,0,4*1,0,1,1,0,1,1,0,1,
           0,0,1,0,1,0,1,1,0,1,0,0,1,0,1,0,5.1,0,1,0,3.1,
           108 A KEY
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1,300,301,0,1,400,1,0,1,0,0,1,1,0,0,1,1,0,0,1,1,0,301,0,
       3+1,3+0,5+1,0,1,1,0,1,0,0,1,0,1,4+6,4+1,
    1 8,0,1,1,3.0,3.1,0,0,1,1,3.0,5.1,0,1,0,0,3.1,
1 0,0,3.1,5.0,1,0,1,1,0,0,5.1,0,3.1,0,0,1,1,0,1,
C
Ç
       111 A KEY
       1,1,0,8,3+1,3+0,3+1,3+0,1,0,1,0,0,1,
    1 3.0,3.1,0,0,6.1,0,1,0,1,1,3.0,4.1,0,8,3.1,6,0,1,0,1,
C
    1 0,0,3*1,3*0,1,0,1,0,1,1,4*0,1,1,0,1,0,
1 3*1,0,3*1,0,1,0,1,7*0,1,1,0,1,1,5*0,1,0,0,1,0,1,1,
C
C
       112 A KEY
       1,3.0,1,1,3.0,3.1,0,1,1,6.0,1,5.0,1,6,
     1 0,1,0,0,1,5+0,1,1,0,1,0,1,0,1,0,1,4+8,4+1,
C
       112 B KEY
       8,4-1,8,1,8,9,1,8,8,1,9,4-1,3-8,1,3-6,4-1,
     1 4-8,1,0,4-1,0,8,1,1,3-8,1,1,3-8,1,1,6,1,1,0,1,
C
       113 A KEY
      3.0,6.1,0,0,1,1,0,3.1,0,5.1,0,1,0,1,0,1,
0,0,1,1,0,3.1,0,1,0,0,3.1,0,1,1,0,1,1,0,4.1,3.0,1,0,1,1,
      1,8,1,1,8,8,1,8,1,1,0,1,1,0,1,6,4,1,
     1 0,1,0,1,0,1,0,9-1,0,1,0,1,6-0,1,0,3-1,0,1,4-0,1,
C
C
        115 A KEY
       1,0,1,1,0,5+1,0,0,1,1,0,0,1,0,1,1,0,1,1,0,1,0,3+1,3+0,
       0,1,0,1,3-0,4-1,0,4-1,0,0,1,0,0,1,3-0,1,0,1,1,
Ç
C
        115 B KEY
     1 4-0,1,4-0,3-1,3-0,1,1,4-0,1,9,3-1,3-0,
     1 1,1,0,0,4-1,4-0,3-1,0,1,0,3-1,0,3-1,0,3-1,
C
С
       116 B KEY
       3-1,0,0,3-1,5-0,1,3-0,1,0,1,0,1,1,1,1,0,0,1,0,
       0,0,3-1,0,0,3-1,0,0,1,0,0,1,0,1,0,1,0,0,1,0,1,0,3-1,
C
C
        301 A KEY
       8,8,1,1,1,8,0,0,1,0,0,1,0,6,8,1,1,0,1,0,1,0,1,1,0,1,0,0,
       C
C
        C
        1 0,0,0,0,1,0,0,0,1,1,1,0,1,0,0,0,1,1,8,0,0,1,0,0,1,0,0,1,1,
        0,0,1,1,0,0,0,1,0,1,1,1,0,0,0,0,1,1,1,0,1,0,0,0,1,0,0,1,0,0,1,0,
        0,1,1,0,0,0,1,0,1,0,1,0,0,0,0,1,0,1,1,6,1,0,0,0,1,1,1,0,1,
        303 A KEY
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C
   343 B KEY
   0,0,1,0,1,0,0,1,0,0,1,0,1,1,0,0,1,0,0,0,0,1,0,0,1,0,0,1,0,0,0,
   1
C
   384 B KEY
   m,1,1,0,0,0,0,1,1,0,0,1,1,0,1,0,1,0,0,0,0,0,0,0,0,0,0,0,0,0,1,0,1,
   C
C
   386 A KEY
   1,1,0,1,1,1,1,0,1,1,1,0,1,1,0,1,1,1,1,0,0,1,1,0,0,0,1,0,1,0,1,1,0,
   C
C
   386 B KEY
   C
   1,0,1,1,0,1,0,1,1,1,1,1,1,1,0,0,1,6,0,0,1,1,0,0,1,1,0,0,1,1,
   C
   308 A KEY
   C
   1,1,0,0,1,0,0,0,1,0,0,0,0,0,0,0,0,0,0,1,1,1,1,1,0,0,1,1,0,0,
   0,0,1,0,0,0,1,1,0,0,0,1,0,0,1,1,1,0,0,1,1,0,0,0,1,0,0,0,1,1,0,0
   8,1,1,1,0,0,1,0,0,0,0,0,0,0,0,0,1,0,0,1,0,0,1,0,1,0,1,1,0,1,0,0,
   C
   1,0,0,1,0,0,1,1,0,1,1,1,0,0,1,0,0,0,0,1,1,1,0,0,1,0,0,1,
   1,1,0,1,1,1,0,0,1,0,0,1,0,0,1,1,0,1,0,0,0,1,0,1,0,1,0,1,1,0,
   1,0,0,1,0,1,1,0,0,0,0,1,1,1,1,0,0,1,0,0,1,0,0,0,1,1,1,1,1,1,1,1,
   311 A KEY
C
```

#,0,1,0,0,1,1,0,0,1,0,0,1,0,0,1,0,0,1,0,0,1,0,0,1,1,1,1,1,0,0,1,

```
8,1,1,1,0,1,1,1,1,0,0,1,1,0,1,0,1,0,0,0,0,0,1,1,1,1,0,0,1,
  1 9,0,1,1,1,0,1,1,1,0,0,0,1,1,0,1,1,0,0,1,1,1,1,1,0,1,0,1,1,1,
    1,1,1,0,0,0,0,1,1,1,1,0,0,0,1,0,0,0,1,1,0,1,1,1,0,0,0,1,1,
    1,1,1,0,0,0,1,1,0,1,0,0,1,0,0,0,1,0,0,1,1,1,1,1,1,1,1,0,0,1,0,
    312 B KEY
    0,1,1,0,0,0,1,0,1,0,0,0,0,0,0,0,0,0,1,0,1,0,1,0,1,0,1,0,
    A, 0, 0, 0, 1, 1, 0, 1, 1, A, 1, B, 0, 0, 1, 1, 0, 1, 1, 1, 0, 1, 0, 0, 1, 0, 1, 0,
C
    313 A KEY
    C
C
    1,0,0,1,0,0,0,1,1,0,1,0,0,0,1,0,1,0,0,0,1,0,1,1,0,0,1,0,0,
    1,4,0,0,0,1,0,0,0,0,1,0,0,0,1,1,0,0,0,1,0,0,0,1,1,1,1,1,0,
C
    314 A KEY
    0,0,0,0,1,1,1,0,0,1,0,0,1,0,0,0,0,0,0,1,1,0,1,0,0,0,1,0,1,
    1,1,0,0,0,1,1,0,0,1,1,1,0,0,1,0,0,0,0,1,0,1,0,1,0,0,0,0,1,
C
C
    314 B KEY
    C
C
    1,0,8,1,0,1,1,0,0,1,0,1,1,0,0,1,1,1,0,1,1,0,1,1,0,0,1,0,1,
    1,0,0,1,1,0,1,0,0,1,1,1,1,1,1,1,1,0,0,1,0,0,1,0,1,0,1,0,0,0,
C
C
    A, 1, 1, 1, 1, 0, 0, 1, 1, 0, 0, 0, 0, 1, 0, 0, 1, 0, 0, 1, 0, 1, 1, 0, 0, 0, 0, 1,
Ç
    316 A KEY
    1,1,1,0,0,4,1,1,1,0,0,0,1,1,1,1,1,1,0,0,1,1,0,1,1,0,0,0,0,0,1,
    C
    8,1,0,1,1,1,1,1,0,0,0,1,0,0,1,6,0,1,0,1,1,9,0,1,1,1,0,0,1,
    C
    317 8 KEY
    M,M,M,0,0,1,1,0,M,0,A,1,0,0,1,1,1,M,M,0,1,1,1,M,1,A,R,1,1,
   1
C
    1
    ε
```

Charles and Charles

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SUB FLATURES KEY

```
3-0,1,0,1,0,1,3-0,7-1,0,1,4-0,1,1,0,1,0,1,3-0,1,0,1,3-0,1,1,
       0,1,0,1,1,0,4+1,3+0,1,3+0,3+1,0,3+1,0,3+1,0,1,5+0,1,0,4+1/

CHCT(X,Y) = (2,+x/Y - 1,)+100,

SE(X,Y,Z) = SQRT((x/Z-Y+Y)/Z)
        00 1 1=1,28
       00 1 Je1,2
        EXPER(I,J)=0.
        DO 1 K=1'2
        vulc(1,J,*)=0.
        XNASAL(1,J,K)=0.
        SUST(I,J,K) =0.
        $181L(I,J,K) #0.
        GRAV(1, J, K) = 0,
        COMP (1, J, K) = 0.
        CONTINUE
1
        00 315 1=1,3
        DO 315 J=1,2
TOT(I,J)=0.
315
        02429.0116000.814
        WHITE (6,278)
270
        FURMAT (30x, 'DIAGNOSTIC HHYME TEST!///)
        WRITE (6,271)
271
        FURNAT ('LISTENER SUMMARIES!')
        82488, 8116888, 814
        WHITE (5, 100)
100
        FURMAT (//1
                          DIAGNOSTIC RHYME TEST SCORING!//)
        WRITE(5,600)
        FURHAT ('INSERT 150 FT CARTRIDGE IN UPPER DECK!/
644
        11/U RESET - CONTINUE 1//)
        PAUSE
        WRITE (5,1000)
        FURMAT ('SYSTEM UNDER TEST? 1/1
                                             1,58(151))
1000
        READ(5,1901) (ISYSTE(1), 1=1,50)
1001
        FURMAT (58A1)
        WRITE(5,101)
101
        FURMAT ( HOW MANY LISTENERS? 1/1
        READ (5, 182) NUML
102
        FURMAT(12)
        HRITE(5,103)
FORMAT(/ HOW MANY SPEAKERST'/
103
        READ (5, 102) NUMS
        NUMT = 16+NUMS
        NUMSUB . B+NUMS
        HRITE(7,601)(ISYSTE(I), I=1,50), NUML, NUMS
601
        FURMAT (50A1, 213)
        DU 200 LIST . 1, NUML
        WRITE (6,3001)
        WHITE (6, 3000) (15YSTE (1), 1=1,50)
        FURMAT (/56A1)
3000
        FURMAT ( 1
                     `†)
3001
        WHITE (5, 2000) LIST
        FURMAT (/'LISTENER', 13, ' NAME'/' ',24('N'))
2968
        READ (5, 20/1) (NAME (LIST, J), Je1, 24)
        FURMAT (24A1)
2001
        write(6,275) LIST, (NAME(LIST, J), J=1,24)
        WHITE (7,2001) (NAME (LIST, J), J01,24)
OU 201 ISPKR = 1, NUM8
        00 618 1=1,7
        DU 616 J#1,2
        DU 618 K#1,3
610
        PAGE(I,J,K) # 0,0
        WHITE (5, 184) LIST, 18PKH
10/
```

DATA KEYSUB/0,0,1,0,1,0,3+1,3+0,1,1,5+0,1,0,1,1,4+0,1,3+0,3+1,

```
FURMAT(/ FOR LISTENER 1, 13, 1 BPEAKER 1, 13//
184
        TENTER KEY NUMBER AND LETTERT/ NNNLT)
        READ (5,185) IKEY, LETTER
105
        FORMAT(13, A1)
        FORMAT(//6x, 1++++1, 16x, 1++1/1KEY = 1, 13, A1,
470
        5x, 13PEAKER IS 1, 42/6x, 1000+1, 16x, 1001//11F OK ENTER 01/1
476
        FORMAT(I1)
        IF (IKEY, EQ. 182) NKEY # 10M8PK# 184 1 0 GOTO 150
        IF (IKEY, EU, 183) NKEY B JOHSPKBIBY OGOTO 150
        IF (IKEY, EU, 184) NKEY # SOMSPK# PO TOGOTO 150
        IF (IKEY, EU, 185) NKEY . 7 OMSPK# PD 1 060TO 158
        IF (IKEY, EQ. 186) NKEY . BOMSPK4 BL OGOTO 150
        IF (IKEY, EQ. 187) NKEY #110M8PK#1CH10GOTO 150
        IF (IKEY, EQ. 108) NKEY #130M8PK#1CH10GOTU 158
        IF (IKEY, EQ. 111) NKEY #150M8PK#1JE10GOTO 158
        IF (IKEY,EG,112) NKEY #170MSPK#18N10GOTO 150
        IF (IKEY, EO, 113) NKEY #180M3PK#1JE10GOTO 154
        IF (IKEY.EU.115) NKEY #210MSPK#1SN10GOTO 158
        IF (IKEY,EU,116) NKEY #230MSPK#18L10GOTO 158
        IF (IKEY.GT.318) GOTO 151
        IF (IKEY.GT.380) NKEY . 25+2+(IKEY-381) +6070 158
        GOTO 151
        IF (LETTER.EQ. 'B') HKEY . NKEY+1+GOTO 152
150
        IF (LETTER, EQ, 'A') GOTO 158
151
        WRITE (5, 106) IKEY, LETTER
        FORMAT(/!****** NO KEY!, [4, A1, 1 ********!//)
100
        GOTO 107
        CUNTINUE
152
        1F (IKEY, LT, 117) GOTO 700
        WRITE(5,781)
        FURHAT (// SPEAKER 71/1 881)
701
        READ (5,782) MSPK
782
        FORMATIA2)
        WRITE (5,475) IKEY, LETTER, MSPK
        READ (5,476) KEYCHK
        IF (KEYCHK . NE . W) GOTO 107
        WRITE(6,290)MSPK, IKEY, LETTER
        FURMAT (21X, A2, 7X, I3, A1)
296
        00 110 IPAGE = 1,4
        WHITE (5, 188) IKEY, LETTER, LIST, IPAGE
 356
        FORMAT(/!FOR KEY!, I4, A1, ! LISTENER!, I3, ! PAGE!, I2//
!ENTER RESPONSE BY COLUMNS!//!; . FIRST WORD 2 = SECOND WORD!//
165
         DU 112 I=1,2
        READ (5,111) (IRESP(I, J), J#1,29)
112
        FORHAT (2911)
 111
         CALL CHECK ($350)
         00 202 1:1,2
         00 202 J=1,29
         INESP(I,J) # IRESP(I,J) #1
 202
         00 203 1001.1,2
         00 284 IRON $2,29
C
         ESTABLISH FEATURE BEING SCORED
         IF (INOH.LE.8) IFEAT= IRON+1
         ITEMP SIRUWS
         IFEATHOD (ITEMP,7)
         IF (IFEAT, EQ. 0) IFEATUT
         ESTABLISH WHICH COLUMN PRESENT STATE OF FEATURE IS IN.
C
         IPRES#1
         If (IPAGE, LE, 2) IPRESOR
         FIND KEY ELEMENT
C
         KEYEL-IHOW
         IF (ICUL, EQ. 2) KEYEL = IROH+29
```

INDEX . 2

```
IF (IPAGE, EQ. 1) GOTO 298
         IF (IPAGE . EQ. 3) GOTO 298
         IF (KEY (KEYEL, NKEY) . NE . IPRES) INDEX=1
         GUTU 299
 298
         IF (KEY (KEYEL, NKEY).EQ. IPRE8) INDEX#1
         INDEX #1 IMPLIES MAIN FEATURE PRESENT; 2 IMPLIES ABSENT.
С
C
         SCORE THE RESPONSE
         ANSHER . 0.8
 299
         IF (IPAGE, EQ. 1) GOTO 295
         IF (IPAGE, EQ. 3) GOTO 295
         IF (KEY (KEYEL, NKEY), NE, IRESP (ICOL, IRON)) ANSHER #1.8
         GOTO 296
 295
         IF (KEY (KEYEL, NKLY), EQ, IRESP (ICOL, IROW)) ANSWER#1.8
         CONTINUE
 246
         IF (IFEAT .EQ. 7) GOTO 257
         ISUBP = 2
         NSUBP #2
         IF (IPAGE, EQ. 1) ISUBP#1
         IF (IPAGE, EQ. 3) ISUBPE!
         IF (KEYSUB (KEYEL, ISUSP), EQ. 8) NSUBP+3
         GOTU(251,252,253,254,255,256), IFEAT
VUIC(LIST, INDEX, 1) = VOIC(LIST, INDEX, 1) + ANSHER
 251
         VOIC (LIST, INDEX, NSUBP) #VOIC (LIST, INDEX, NSUBP) + ANSHER
         PAGE(1,INDEX,1) = PAGE(1,INDEX,1) + ANSHER
         PAGE (1, INDEX, NBUBP) . PAGE (1, INDEX, NBUBP) + ANSWER
         GDTG 260
         xnasal(LIST, INDEX, 1) ** XNABAL(LIST, INDEX, 1) ** ANSHER
 252
         XNASAL (LIST, INDEX, NSUBP) WXNASAL (LIST, INDEX, NSUBP) + ANSWER
         PAGE (2, INDEX, 1) *PAGE (2, INDEX, 1) *ANSWER
         PAGE (2, INDEX, NSUBP) *PAGE (2, INDEX, NSUBP) +ANSWER
         GOTO 260
 253
         SUST (LIST, INDEX, 1) = SUST (LIST, INDEX, 1) + ANSWER
         SUST (LIST, INDEX, NSUBP) #SUST (LIST, INDEX, NSUBP) + ANSHER
         PAGE (3, INDEX, 1) #PAGE (3, INDEX, 1) + ANSWER
         PAGE (3, INDEX, NSUBP) *PAGE (3, INDEX, NSUBP) *ANSWER
         GUTU 260
         SIBIL(LIST, INDEX, 1) +SIBIL(LIST, INDEX, 1) +ANSHER
 254
          SIBIL (LIST, INDEX, NSUBP) #SIBIL (LIST, INDEX, NSUBP) + ANSWER
         PAGE (4, INDEX, 1) *PAGE (4, INDEX, 1) *ANSHER
         PAGE (4, INDEX, NSUBP) *PAGE (4, INDEX, NSUBP) *ANSHER
         GOTU 260
 255
          GHAY(LIST, INDEX, 1) = GRAV(LIST, INDEX, 1) + ANSHER
          GRAV(LIST, INDEX, NSUBP) = GRAV(LIST, INDEX, NSUBP) + ANSWER
          PAGE (5, INDEX, 1) *PAGE (5, INDEX, 1) +ANSKER
         PAGE (5, INDEX, NSUBP) #PAGE (5, INDEX, NSUBP) +ANSWER
          GOTO 250
 256
          COMP(LIST, INDEX, 1) . COMP(LIST, INDEX, 1) . ANSWER
          COMP(LIST, INDEX, NSUBP) = COMP(LIST, INDEX, NSUBP) + ANSWER
          PAGE (0, INUEX, 1) *PAGE (6, INDEX, 1) +ANSHER
          PAGE (6, INDEX, NSUBP) *PAGE (6, INDEX, NSUBP) *ANSWER
          G010 268
 251
          EXPER(LIST, INDEX) *EXPER(LIST, INDEX) + ANSWER
          PAGE (7, INDEX, 1) = PAGE (7, INDEX, 1) + ANSHER
 260
          CUNTINUE
          CONTINUE
 204
 203
          CONTINUE
          CONTINUE
110
          DU 611 1-1,7
          00 611 J=1,2
          00 611 K#1,3
          NPAGE(I, J, K) #IFIX (PAGE(I, J, K) +, 5)
 611
          WRITE (7,675) MSPK
 675
          FORMAT (A2)
          WRITE(7,612)(((NPAGE(1,J,K),I=1,7),J=1,2),K=1,3)
```

```
612
         FORMAT(I3)
         CONTINUE
201
         IPASS # 1
         FORMAT(//5x, LISTENERI, 13, 1 SPEAKERI, 3x, 1 KEYI, 5x, 24A1)
275
         WRITE (6, 291)
         FURHAT (/5X, INUMBER OF CORRECT RESPONSES 11//)
291
303
         WRITE (6, 276)
         FORMAT (10x, IMAIN ATTRIBUTE: 1, 18x, IPRESENT1,7x, IABSENT1//)
276
          wRITE(6,277) (VOIC(LIST, 1,1), 101, 2)
          FORMAT (15x, 1 VOICING 1, 28x, F7, 2, 6x, F7, 2)
277
         HRITE(6,278) (VOIC(LIST, I, 2), I=1,2)
FORMAT(28x, 'FRICTIONAL', 13x, F7, 2,6x, F7,2)
278
          HRITE (6, 279) (VOIC (LIST, 1, 3), 1+1, 2)
          FURHAT (28X, INON-FRICTIONALI, 9X, F7, 2, 6X, F7, 2/)
279
          HRITE (6, 280) (XNASAL (LIST, 1, 1), 141, 2)
          FORMAT (15x, 'NASALITY', 19x, F7, 2, 6x, F7, 2)
HRITE (6, 281) (XNASAL (LIST, 1, 2), 181, 2)
284
          FURMAT (20X, 'GRAVE', 18X, F7, 2, 6X, F7, 2)
981
          WHITE (6, 282) (XNASAL (LIST, 1,3), 1=1,2)
          FURMAT (28X, 'ACUTE', 18X, F7, 2, 6X, F7, 2/)
WRITE (6, 283) (8UST (LIST, I, 1), I = 1, 2)
 282
          FORMAT (15x, 18USTENTION1, 17x, F7.2, 6x, F7.2)
 283
          HRITE(6,284)(SUST(LIST,I,2),101,2)
FORMAT(28x,'VOICED',17x,F7,2,6x,F7,2)
HRITE(6,285)(SUST(LIST,I,3),101,2)
 284
          FURNAT (20X, "UNVOICED", 15X, F7.2, 6X, F7.2/)
 265
          WRITE (6, 266) (SIBIL (LIST, 1, 1), 1-1, 2)
          FORMAT(15x, 1818] LATION1, 17x, F7, 2, 6x, F7, 2)
 286
           WRITE (8, 284) ($181L(LIST, 1, 2), 1#1, 2)
           WRITE (6, 285) (SIBIL (LIST, 1, 3), IP1, 2)
           WHITE (6, 267) (GRAV (LIST, 1, 1), 181, 2)
           FORMAT (15x, 1 GRAVENESS 1, 18x, F7, 2, 6x, F7, 2)
 287
           MNITE (6, 284) (GRAV (LIST, 1, 2), 191, 2)
           WRITE (6, 285) (GRAV (LIST, 1, 3), 1=1, 2)
          WHITE (6, 208) (COMP (LIST, I, 1), I=1,2)
FORMAT (15x, 1COMPACTNESS, 16x, F7, 2, 6x, F7, 2)
 286
           WRITE (6, 284) (COMP (LIST, 1, 2), 181, 8)
           HRITE (6, 285) (COMP (LIST, 1, 3), 1=1, 2)
           IF (IPASS . EQ. 2) GOTO 384
02429, 0116808, 014
           CUNTINUE
           X#FLOAT (NUMT)
           YEFLOAT (NUMBUS)
           DU 308 L-1, NUML
           DO 300 I=1,2
           DU 300 Je1,3
           Zex
           IF (J.GT.1)ZBY
           wavoic(L,I,J)
           VOIL(L,I,J) = CRCT(H,Z)
W=SUST(L,I,J)
           SUST (L,I,J) #CRCT (W,Z)
           W=GRAV(L,I,J)
           GRAV(L,1,J) *CRCT(N,Z)
#=COMP(L,1,J)
           COMP(L,I,J) ACRCT(H,Z)
            HEXHABAL (L, I, J)
            XNASAL(L,1,J) #CRCT(W,Z)
            wesibil(L,I,J)
            SIBIL (L, I, J) #CRCT (W, Z)
  300
            CONTINUE
            1PA88=2
            DO 301 LISTOI, NUML
```

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A2420,0115000,014
        WHITE(6,3801)
        WHITE(6,3000)(ISYSTE(I), I=1,50)
        WRITE(6,302)LIST, (NAME(LIST, J), Je1,24)
FURMAT('LISTENER', I3,' PERCENT CORRECT HITH GUESSING',
382
        1 TRANSFORMATION1/24A1//)
        GOTO 383
        CONTINUE
384
381
        CUNTINUE
        DU 318 I=19,28
        ME 1
        IF (I, EQ, 20) H42
        ZEFLOAT (NUML)
        1F (1,E0,20) Z-1,8
        DU 318 J=1,2
        DU 318 K#1,3
        DO 318 L=1, NUML
        VOIC(I,J,K) = VOIC(I,J,K) + VOIC(L,J,K) + + M/Z
        XNASAL(I,J,K) «XNASAL(I,J,K) +XNASAL(L,J,K) **M/Z
        SUST(1, J, K) = SUST(1, J, K) + SUST(L, J, K) + + M/Z
        8181L(1,J,K) *SIBIL(1,J,K) *SIBIL(L,J,K) **M/Z
         GHAV (1, J, K) = GHAV (1, J, K) + GRAV (L, J, K) + + M/Z
         COMP(I,J,K) + COMP(I,J,K) + COMP(L,J,K) + + M/Z
         CONTINUE
310
         Z#FLOAT (NUML)
         00 312 Je1,2
         DO 312 Ke1,3
         X = VOIC (20, J, K)
         Yavuic(19, J, K)
         VOIC(20,J,K) #8E(X,Y,Z)
         XAXNASAL (20, J,K)
         YEXNASAL (19, J,K)
         XNASAL (28, J, K) =SE(X, Y, Z)
         x=sust(20,J,K)
         Y#8UST (19, J, K)
         SUST (20, J, K) #8E(X,Y,Z)
X#S181L(28, J,K)
         Y=518IL(19,J,K)
         SIBIL (20, J, K) = 8E (X, Y, Z)
         XEGRAY(20,J,K)
         Y#GRAY (19, J, K)
         GHAV (20, J, K) 48E (X, Y, Z)
         X4COMP(28,J,K)
         Y=COMP(19, J, K)
         CUMP (20, J, K) = 8E (X, Y, Z)
 312
         CONTINUE
         ZEFLOAT (2 * NUML)
         00 313 Je1,3
00 313 Le1, NUML
         00 313 Ke1,2
         VOIC(18,1,J) #VOIC(18,1,J) +VOIC(L,K,J)/2
         XNASAL(16,1,J) = XNASAL(18,1,J) + XNASAL(L,K,J)/Z
SUST(16,1,J) = SUST(18,1,J) + SUST(L,K,J)/Z
         SIBIL(18,1,J) = SIBIL(18,1,J) + SIBIL(L,K,J)/Z
         GRAV(18,1,J) #GRAV(18,1,J) +GRAV(L,K,J)/Z
         CUMP(18,1,J) *COMP(18,1,J) *COMP(L,K,J)/Z
 313
         CONTINUE
         DO 428 K=1,3
         DU 426 L#1, NUML
         VUIC(18,2,K) = VOIC(18,2,K) + (VOIC(L,1,K) + VOIC(L,2,K)) + *2/4,
         XNABAL (18,2,K) DXNABAL (18,2,K) + (XNABAL (L,1,K) + XNABAL (L,2,K)) + +2/4.
         8UST(18,2,K) = 8UST(18,2,K) + (SUST(L,1,K) + 8UST(L,2,K)) + +2/4,
         $161L(18,2,K) #$181L(18,2,K) + ($181L(L,1,K) +8181L(L,2,K)) **2/4,
         GHAY (18,2,K) + GRAY (18,2,K) + (GRAY (L,1,K) + GRAY (L,2,K)) ++2/4.
```

```
428
        CUMP (18, 2, X) = COMP (18, 2, K) + (COMP (L, 1, K) + COMP (L, 2, K)) + +2/4.
        Z=FLOAT (NUML)
        00 311 K=1,3
        X = VOIC(18,2,K)
        Y=V01C(18,1,K)
        VOIC(18,2,K) #8E(X,Y,Z)
        XBXNASAL (18,2,K)
        YEXNASAL (18,1,K)
        XNA5AL(18,2,K)=8E(X,Y,Z)
        x=SUST(18,2,K)
        Y=8U$T(18,1,K)
        SUST (18,2,K) #SE(X,Y,Z)
        X#5181L(18,2,K)
        Y=8181L(18,1,K)
        BIBIL (18,2,K) = 8E (X,Y,Z)
        X=GRAV(18,2,K)
        Y=GHAY(18,1,K)
        GHAY (18, 2, K) = BE (X, Y, Z)
        X4COMP (18,2,K)
        Y = COMP (18,1,K)
        CUMP (18,2,K) +8E (X,Y,Z)
        CONTINUE
311
        00 316 L=1, NUML
        DO 316. Je1,2
        00 316 K+1,2
        ZOFLOAT (O.NUML)
        IF (K.EQ. 2) Z=1.0
        $UM=VOIC(L,J,1)
        SUM-SUM-XNASAL (L, J, 1)
        SUM=8UM+8UST (L, J, 1)
        SUM + 8UM + SIBIL (L, J, 1)
        SUM=SUM+GRAV(L,J,1)
SUM=SUM+COMP(L,J,1)
        IF (K.EU.2) SUM#SUM/6.8
        TOT (J,K) #8UM**K/Z *TOT (J,K) CONTINUE
310
        DO 880 IIII=1,2
TUT(3,1)=0,8
        TOT (3,2) *0.0
u2420,0116000,014
        WRITE (6, 488) NUML
        WRITE(6, 401) (1878TE(1),141,58)
        WRITE (6, 402) NUMS
        WHITE (6,551)
551
        FURHAT('LISTENER MEAN DRT!)
        DO 461 Le1, NUML
        SUM=0.0
        00 502 J=1,2
        SUH . SUH + VOIC(L,J,1)
        SUM . SUM + XNABAL(L,J,1)
        SUH . SUH + SUST (L, J, 1)
        8UM . SUM . SIBIL(L,J,1)
        SUM = SUM + GRAV(L,J,1)
        SUM + SUM + COMP(L,J,1)
        CONTINUE
502
        X5UH . SUH/12,8
        WHITE (6,550) L, XBUM, (NAME (L, J), Je1,24)
550
        FURMAT(15,F11,2,3x,24A1)
        TUT (3,1) = TOT (3,1) + SUM/FLOAT (NUML)/12,8
        TUT (3,2) #TOT (3,2)+(8UM/12,8)++2
481
        CUNTINUE
        2 = FLOAT (NUML)
```

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x=101(3,2)

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Y . TOT (3,1)
        TUT (3,2) = SE(X,Y,Z)
        00 317 J=1,2
        ZUFLOAT (NUML)
        X TOT (J, 2)
        Y=TOT(J,1)
        TUT (J,2) 48E(X,Y,Z)
317
        CONTINUE
        FORMAT ('DRT HEANS AND STANDARD ERRORS FOR 1, 13, 1 LISTENERS 1/)
486
        FORMAT('SYSTEM UNDER TESTS ',5841/)
401
        FURMAT(INUMBER OF SPEAKERS #1,12/)
482
        WRITE(6, 403)
        FURHAT(//!MAIN ATTRIBUTE: 1,12x, PRESENT!, 18x, 1ABSENT!,
493
        12x, TOTALIA
        HRITE(6,494)
        FURMAT (20x,3(4x, 1 MEAN
                                      s,£,
484
        HRITE(8,405)((VOIC(1,J,1), In19,20), Jo1,2), (VOIC(18,1,1), In1,2)
        FURNAT (3x, 1VOICING1,9x,3(3x,F6,2,2x,F6,2))
485
        WRITE(8,486)((VOIC(1,J,2),I019,20),J01,2),(VOIC(18,1,2),I01,2)
        FORMAT (6x, 1FRICTIONAL 1, 4x, 3 (3x, F6, 2, 2x, F6, 2))
485
        WRITE(6,497)((VOIC(1,J,3),1019,26),J01,2),(VOIC(18,1,3),101,2)
FORMAT(6x,1HON-FRICTIONAL1,3(3x,F6,2,2x,F6,2)/)
487
         HRITE(6,486)((XNASAL(I,J,1),1=19,20),J=1,2),
         (XNASAL (18,1,1), I=1,2)
         FORMAT (3x, INASALITYI, 8x, 3 (3x, F6, 2, 2x, F6, 2))
         WHITE(6, 409) ((XNASAL(I, J, 2), I=19, 20), J=1, 2),
         (XNASAL (18, I, 2), IU1, 2)
         FURMAT (6x, 1GRAVE1, 9x, 3 (3x, F6, 2, 2x, F6, 2))
489
         WHITE (6, 410) ((XNABAL (1, J, 3), 1019, 20), J01, 2),
         (XNASAL (18, I, 3), I = 1, 2)
         FORMAT (6x, 14CUTE1, 9x, 3 (3x, 78, 2, 2x, 78, 2)/)
 410
         WKITE(6,411)((8U8T(1,J,1),1=19,20),J=1,2),(8UST(10,1,1),1=1,2)
         FURMAT (3x, 18USTENTION 1, 6x, 3 (3x, F6, 2, 2x, F6, 2))
 411
         WRITE(6,412)((8UST(1,J,2),1=19,20),J=1,2),(8UST(18,1,2),1=1,2)
         FORMAT(6x, 1 VOICED 1, 8x, 3 (3x, F6, 2, 2x, F6, 2))
 412
         HRITE(6,413)((8UST(1,J,3),1-19,20),J-1,2),(8UST(18,1,3),1-1,2)
         FURMAT (6X, !UNVOICED!, 6X, 3 (3X, F6, 2, 2X, F6, 2) /)
 413
         WRITE(6,414)((SIBIL(1,J,1),1019,28),J01,2),(8181L(18,1,1),101,2)
FORMAT(3x,1818ILATION1,6x,3(3x,66,2,2x,66,2))
 414
         WRITE(6,412)((SIBIL(1,J,2),1=19,20),J=1,2),(SIBIL(18,1,2),1=1,2)
         WHITE (6,413) ((SIBIL(1,J,3), In19,20), Je1,2), (SIBIL(10,1,3), In1,2)
WRITE (6,415) ((GRAY(I,J,1), In19,20), Ja1,2), (GRAY(10,1,1), In1,2)
         FURMAT (3x, 'GRAVENESS', 7x, 3(3x, F6, 2, 2x, F6, 2))
 415
         HHITE(6,412)((GRAV(I,J,2),I010,R0),J=1,2),(GRAV(18,1,2),I01,2)
         WHITE(6,413) ((GRAV(1,J,3),1-19,20),J-1,2), (GRAV(18,1,3),1-1,2)
         WHITE (6, 416) ( (COMP (I, J, 1), I=19,28), J=1,2), (COMP (18,1,1), I=1,2)
         FURMAT (3x, 'COMPACTNESS', 5x, 3 (3x, F6, 2, 2x, F6, 2))
 410
         WHITE (6, 412) ((COMP(I, J, 2), 1019, 20), J01, 2), (COMP(18, I, 2), I01, 2)
         WRITE(6,413)((COMP(1,J,3),1019,28),J01,2),(COMP(18,1,3),101,2)
         HRITE(6,417)((TOT(1,J),J#1,2),1#1,3)
         FORMAT (3x, 'TOTALS', 10x, 3 (3x, 76, 2, 2x, 76, 2))
 41/
         HHITE (6,490) (TOT (3,J),J#1,2)
 490
         FORMAT (/30x, 1 - + + + + + + + + + + + + + + + 1/
         30X, 10 MEAN 4 1, F6, 2, 1 01/
13X, 1TOTAL DRT SCORES 01, 15X, 101/
         30x, 1+ 8.E. # 1, F6, 2, 1 +1/
         NUMTOT . 192 NUML NUMB
         WRITE (6,555) NUMTOT
         FURHAT (/18X TOTAL NUMBER OF TEST ITEMS #1,17)
 555
 844
         CONTINUE
         8104
         ENU
```

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A 410 Car Carlo A 440 Car Car

```
C
C
C
C
         SUBROUTINE CHECK (IOVER)
         THIS SUBRUUTINE CHECKS FOR CORRECT ENTRY OF DATA
C
         DIMENSION LINE (31)
         CUMMUN IRESP (2,29)
         IPASS =1
 31
         N#1
         M#15
 26
         IF (IPASS.EQ. 2) N=160H=29
         02400,0110000,014
         WRITE (5,21)
         FORMAT (18x, 111, 16x, 121/)
 21
         DO 1 IPN, H
         00 3 11 = 1,31
LINE(11) = 1 1
 3
         IF (IRESP(1,1).EQ.2)GOTO 4
         L=5
         IF (IRESP(1,1),NE,1)L=13
         00 2 Ja1,L
LINE(J) = 1x1
         GUTO 5
         CUNTINUE
         DU 6 J = 9,13
         LINE(J) . IXI
         CONTINUE
         IF (IRLSP(2,1),EQ,2)G010 8
         L=23
         1F (IRESP(2,1),NE,1)L#31
         DU 7 Je19,L
         LINE(J) = 'X'
         GOTO 9
         CONTINUE
         00 10 J#27,31
         LINE(J) = 1X1
         CUNTINUE
         WHITE(5,11)1,(LINE(J),J#1,31)
         FURMAT (5x, 12, 5x, 31A1)
 11
         CUNTINUE
         HRITE (5,12)
         FURMAT ( / TIF OK ENTER WT)
 12
         REAU (5,13) IANS
 13
         FORMAT(11)
         IF (IANS, EU, Ø) GOTO 14
 311
         WHITE(5,15)
 15
         FURNATI/IRON AND COLUMN TO CHANGE?
                                                   ENTER 999 TO CHANGE ENTIRE!
         1 PAGE 1/1 RRC!)
         READ (5, 16) INOH, ICOL
         IF (IROW, EU, 99) RETURN TOVER
         1F (1RUH, GT, 29) GOTO 30
         IF (IROW.LT.1)G0T0 38
IF (ICOL.GT.2)G0T0 38
         1F (ICUL. 17.1)GOTO 30
         FURHAT (12,11)
 16
         WHITE (5,17)
 17
         FORMAT (/INEW ENTRYTI/1 R1)
```

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READ(5,13) IRESP(ICOL, IROW)

IF (IROW, LE, 15) GOTO 31
GUTU 20
IF (IPASS , EU, 2) RETURN
IPASS = 2
GUTU 20
END

```
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                                                            10 FEB 76
Ç
         DIAGNOSTIC RHYHE TEST SCORING W/CARTRIDGE INPUT
         CSP=30 IMPLEMENTATION
C
         FUR INFORMATION CONCERNING THIS PROGRAM CONTACT:
0000000000
                           CAPTAIN STEVEN MEISTER
                           ESD/MCE
                           HANSCOM AFB, HA 81731
                           TELEPHONE!
                                COMM. (617) 861-4433
                                AUTOVON
                                              478-4433
C
Ç
         CUMMON ARRAY (58), ISYS(50), NAME (11,24), NPAGE (7,2,3),
         DATA(11,7,36), MSPK(11,6)
DIMENSION SEND(6)
         WKITE (5,50)
         FURMAT(////20X, 'DRT CARTRIDGE DATA CHECKOUT!//
 58
         INSERT CARTRIDGE IN UPPER DECK 1//
         *1/U RESET - CONTINUE 1/)
         PAUSE
         READ(7,75)(1845(1),1=1,50), NUML, NUMS
 15
         FUHMAT (50A1, 213)
         FUHMAT (5841// NUMBER LISTENERS #1, 13/ NUMBER SPEAKERS #1, 13//)
 1
         02420,0116000,014
         DO 2 LIST = 1, NUML
         HEAD (7,3) (NAME (LIST, 1), 1=1,24)
         FURMAT (24A1)
 3
         DU 4 ISPK = 1, NUMS
         DU 4 13.
HRITE(6,500)
 500
         FUNMAT(
         WHITE (6,1) (ISYS(I), I=1,50), NUML, NUMS
         REAU(7,30)MSPK(LIST, ISPK)
 38
         FORMAT (A2)
         READ(7,5)(((NPAGE(1,J,K),I=1,7),J=1,2),K=1,3)
 þ
         FURMAT (13)
         HHI1E(6,40) (NAME(LIST,1),1=1,24),MSPK(LIST,1SPK)
FURMAT(9x,28('+1),18x,6('+1),/
 48
         'LISTENER: 1,24A1,1 * SPEAKER: *1,1X,A2,1 *1/
9X,28(1*1),10X,6(1*1),//
          "NUMBER OF INCORRECT RESPONSES11//)
      1
         DU 20 I=1,6
         DU 22 Kal, 3
         DO 41 J=1,2
         L . 6+1+J+2+K-8
         NTOT # 16
          IF (K.NE.1) NTOTOB
          TOT # FLOAT (NTOT)
         DATA(LIST, 18PK,L) = (2.8 + FLOAT (NPAGE(1, J,K)) + TOT) + 188,/TOT
         NPAGE(I,J,K) = NTOT-NPAGE(I,J,K)
         CONTINUE
         CONTINUE
 22
  20
         CUNTINUE
         WHITE (6,276)
          WHITE (6,277) (NPAGE (1, J, 1), J=1,2)
```

WHITE (6,278) (NPAGE (1, J, 2), J=1,2)

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```
WRITE(6,279) (NPAGE(1,J,3),J=1,2)
       WRITE(6,288) (NPAGE(2,J,1),J=1,2)
       WRITE(6,281) (NPAGE(2,J,2),J#1,2)
       WRITE(6,282) (NPAGE(2,J,3),JP1,2)
       HHITE (6, 283) (NPAGE (3, J, 1), J+1, 2)
       HRITE(6,284) (NPAGE(3,J,2),J=1,2)
       WRITE(6,285) (NPAGE(3,J,3),J01,2)
       WRITE(6,286) (NPAGE(4,J,1),J=1,2)
       WRITE (6,284) (NPAGE (4, J, 2), J+1,2)
       HRITE(6,285) (NPAGE(4,J,3),J#1,2)
       HRITE(6,287) (NPAGE(5,J,1),J#1,2)
       HRITE(6, 284) (NPAGE (5, J, 2), J=1, 2)
       HRITE(6,285) (NPAGE(5,J,3),J=1,2)
       HRITE(6,288) (NPAGE(6,J,1),J#1,2)
       WRITE(6,284) (NPAGE(6,J,2),J=1,2)
       WRITE(6,285)(NPAGE(6,J,3),J#1,2)
       02420,0116000,014
21
       FURMAT(10X, 15, 5X, 15)
       CONTINUE
       CONTINUE
2
       DO 286 LIST-1, NUML
       82428,8110888,814
       WRITE (6,500)
       WRITE(6,1)(15YS(1),141,58), NUML, NUMS
       WRITE(6,201) (NAME(LIST, I), I=1,24)
281
       FORMAT (13x, 27 (1+1) / 1FOR LISTENER: 1,24A1,1 +1/
       13x,27(1+1)//
        ISPAR SCURE!/)
       00 284 ISPKH-1, NUMS
       SUM . 0.0
       00 202 1-1,31,6
       J=1+1
262
       SUM # SUM + DATA(LIST, ISPKR, I) + DATA(LIST, ISPKR, J)
       SUM = SUM/12.0
       WRITE(6,203) MSPK(LIST, ISPKR), SUM
       FORMAT(1x, A2, 1x, F7, 2)
283
       CUNTINUE
284
       WRITE(6,483)
        WRITE(6,404)
       00 209 1-1,6
        $END(1) =0.0
289
       DO 210 1=1,35,2
        J * I + 1
       00 211 K=1, NUMS
        ARRAY(K) #DATA(LIST,K,I)
211
        CALL STATS (NUMS, X, S)
        SEND (1) 4 X
        SEND (2) .8
        DO 212 K#1, NUMS
212
        ARRAY(K) #DATA(LIST,K,J)
        CALL STATS (NUMS, X, S)
        SEND(3) . X
        SEND(4) 4 5
        DO 213 KE1, NUMS
        ARRAY(K) = (ARRAY(K)+DATA(L1ST, K, 1))/2,0
213
        CALL STATS (NUMS, X, S)
        SEND (5) UX
        SEND (6) +5
        CALL OUT (I, SEND)
        CONTINUE
210
        DO 215 K#1,NUMS
        8UM . 0.0
        00 214 1-1,31,6
214
        SUM . SUM . DATA(LIST,K,I)
```

```
215
       ARRAY(K) = SUM/6.8
       CALL STATS (NUMS, X, S)
        SENU(1)=K
        SEND (2) +5
       DU 216 K#1, NUM5
        SUM = 0.0
        DU 217 1=2,32,6
        SUM # SUM + DATA(LIST,K,I)
217
210
        ARRAY(K) = SUM/6.6
        CALL STATS (NUMS, X, S)
SEND (3) + X
        SEND (4) # 3
        DU 219 K=1, NUMS
        SUM . 0.0
        00 218 1-1,31,6
        J = I+1
        SUM = SUM + DATA(LIST, K, I) + DATA(LIST, K, J)
218
        ARRAY(K) = 8UM/12.8
219
        CALL STATS (NUMS, X, S)
        SEND(5) . X
        SEND (6) . S
        CALL UUT (36, SEND)
HKITE (6, 490) X, S
266
        CONTINUE
        DU JON ISPKR . 1, NUMS
        92420,9116000,014
        WRITE (6,500)
        WHITE(6,1)(ISYS(I), I=1,50), NUML, NUMS
        WRITE(6,301) MSPK(1,15PKR)
        FURMAT(12x, !+++++!/!FOR BPEAKER: !,A2, ! +!/
        12x, 1++++1// LISTENER 1, 18x, 18CORE 1/)
        DU 304 LIST = 1, NUML
        SUM . 0.0
        00 302 141,31,6
        J#I+1
382
        SUM = SUM+DATA(LIST, ISPKR, I)+DATA(LIST, ISPKK, J)
        SUM . SUM/12.8
        HRITE(6,383)(NAME(LIST,L),L=1,24),SUM
393
        FURMAT (24A1, F7.2)
304
        CONTINUE
        WRITE(6,403)
        WRITE(6,404)
        DU 318 1=1,35,2
        J=1+1
        DU 311 K=1, NUML
        AHRAY(K) BUATA(K, ISPKR, I)
311
        CALL STATS (NUML, X, S)
        SEND (1) = X
        SEND (2) = 5
        00 312 K=1, NUML
312
        ARRAY (K) =DATA (K, ISPKR, J)
        CALL STATS (NUML, X, 3)
        SEND(3)=X
        $END (4) #$
        DU 313 K=1, NUML
313
        ARRAY(K) = (ARRAY(K)+DATA(K, ISPKR, 1))/2,8
        CALL STATS (NUML, X, S)
        $END (5) = X
        SEND (6) =8
        CALL OUT (1, SEND)
310
        CONTINUE
        DU 315 K#1, NUML
        SUM = 0.0
00 314 1=1,31,6
```

```
314
       SUM # SUM + DATA(K, ISPKR, I)
        ARRAY(K) = SUM/6.0
315
       CALL STATS (NUML, X, 5)
SENU(1) = X
       SENU (2) +5
       DO 316 K=1, NUML
       SUM . 8.0
        DU 317 I=2,32,6
317
        SUM . SUM+DATA (K, ISPKR, I)
        ARRAY(K) &SUM/6.0
310
        CALL STATS (NUML, X, S)
SEND(3) = X
        SEND (4) = 8
        DU 319 K=1, NUML
        SUM .0.8
        00 318 1-1,31,6
        J=1+1
        SUM = SUM+DATA(K, ISPKR, I)+DATA(K, ISPKR, J)
310
319
        ARRAY(K) =SUM/12.F
        CALL STATS (NUML, X, S)
        SEND (5) = X
        SEND (6) .S
        CALL OUT (36, SEND)
        WHITE (6, 498) X, S
300
        CUNTINUE
        02424,4110040,014
        WHITE (6,500)
        WRITE(6,1)(1375(1),1=1,58), NUML, NUMS
        WHITE (6,320)
        FORMAT ( CUMBINED RESULTS - STANDARD ERRORS ACROSS 1,
320
        ISPEAKERS AND LISTENERS ******//)
        wRITE(6,403)
        WRITE (6, 404)
        NUMT . NUML . NUMS
        DU 321 1=1,35,2
        J=I+1
        DU 322 K#1, NUML
        DU 322 L =1, NUMS
        MENUMS+(K+1)+L
        ARRAY (M) SDATA (K, L, I)
322
        CALL STATS (NUMT, X,S)
        SENU(1) = X
        SENU (2) = 5
        00 323 K=1, NUML
        DU 323 La1, NUMS
        M=NUMS+(K-1)+L
323
        AKKAY(M) BUATA(K,L,J)
        CALL STATS (NUMT, X, S)
        SEND(J)=X
        SEND (4) = S
        OU 324 K#1, NUML
        00 324 L=1,NUMS
        M=NUM5+(K-1)+L
        SUM = DATA(K,L,1)+DATA(K,L,J)
324
        AHRAY(H)=SUM/2.6
        CALL STATS (NUMT, X,S)
        SEND(5) = X
        SEND(6) = 5
        CALL UUT (I, SEND)
        CUNTINUE
321
        00 325 K#1, NUML
        00 325 L=1,NUMS
```

H=NUMS+ (K-1)+L

```
SUM . 6.8
        DU 326 1=1,31,6
SUM = SUM-DATA(K,L,1)
326
        AHRAY (M) .SUM /6.8
325
        CALL STATS (NUMT, X, S)
        SEND(1) .X
        SEND (2) =5
        00 327 K#1, NUML
00 327 L#1, NUMS
        MaNUMS+(K+1)+L
        SUMTO, 0
        00 328 1=2,32,6
328
        SUM # SUM + DATA(K,L,1)
        ARRAY (H) #SUM/6.0
327
        CALL STATS (NUMT, X, S)
        SEND(J)=X
        SEND (4) #5
        00 338 K#1, NUML
        DU 334 L#1, NUMS
        M&NUM8+(K+1)+L
        SUM=0.0
        00 331 1+1,31,6
        J=1+1
        BUM - SUN+DATA(K,L,I)+DATA(K,L,J)
331
336
        ARRAY (M) +8UM/12.0
        CALL STATS (NUMT, X, S)
        SEND (5) ex
        84ND (6) = 5
        CALL OUT (36, SEND)
        WRITE (6,498) X,3
        02420,0116000,014
        WRITE (6,500)
        WRITE (6,1) (ISY8(I), I=1,50), NUML, NUMS
        DO 78 IOI, NUML
        DO 78 Je1, NUMS
        WRITE (6,71) (DATA (1, J, K), K#1, 36)
        FURMAT (/(6(2X,F10,2)))
71
78
        CONTINUE
        STOP
        FORMAT (10x, 'MAIN ATTRIBUTE: ', 18x, 'PRESENT', 7x, 'ABSENT'//)
276
        FURMAT (15x, ' VOICING', 23x, 12, 11x, 12)
277
        FURMAT (20x, FRICTIONAL 1, 16x, 12, 11x, 12)
278
279
        FORMAT (20x, 'NON-FRICTIONAL', 12x, 12, 11x, 12/)
        FURMAT (15x, 'NASALITY', 22x, 12, 11x, 12)
286
        FORMAT (20x, 'GRAVE', 21x, 12, 11x, 12)
281
        FURMAT (20X, 'ACUTE', 21X, 12, 11X, 12/)
FORMAT (15x, 'SUSTENTION', 20X, 12, 11X, 12)
282
283
        FORMAT (20x, 'VUICED', 20x, 12, 11x, 12)
284
285
        FUHMAT (20x, 'UNVOICED', 18x, 12, 11x, 12/)
        FORMAT (15x, 'SIBILATION', 20x, 12, 11x, 12)
280
        FURMAT (15x, 1 GHAVENESS 1, 21x, 12, 11x, 12)
287
288
        FURHAT (15x, 1 COMPACTNESS 1, 19x, 12, 11x, 12)
480
        FURNAT (IDHT MEANS AND STANDARD ERRORS FOR 1, 13, 1 LISTENERS 1/)
         FORMAT ('SYSTEM UNDER TEST: 1,5841/)
481
         FURMAT ( NUMBER UF SPEAKERS = 1, 12/)
402
         FORMAT(// MAIN ATTRIBUTE 11, 12x, PRESENT1, 18x, ABSENT1,
483
        12x, TOTAL 1/)
     1
484
         FORMAT (20X, 3 (4X, THEAN
                                      S.E. 1)/)
498
         FURNAT (/38X, 1+++
         38x, 1 + HEAN # 1, F6, 2, 1 +1/
         13x, TOTAL DRT SCORE 1 +1,15x,1+1/
         30x, 1 + 8, E. + 1, F6, 2, 1 +1/
         END
```

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```
SUBROUTINE STATS (N. XMEAN, STDERR)
        CUMMUN ARRAY (68)
        X . . .
        XN # FLUAT(N)
        00 1 1=1,N
        X = X + ARRAY(I)
        CUNTINUE
1
        XMEAN . X/XN
        STDERH . U.O
        DU 2 I=1,N
         STDERK = STDERR + (ARHAY(I) - XMEAN) + (ARRAY(I) - XMEAN)
        STDERH = SQRT(STDERR/XN/XN)
        RETURN
        ENU
C
C
00000
         SUBROUTINE UUT(N.X)
         DIMENSIUN X(6)
         IF (N, EQ, 36) GOTU 19
         K4(N+1)/2
         IF (K.EQ.11)K=8
         IF (K, EQ. 14) K=8
         IF (K, EQ, 17) K=8
         IF (K. EQ. 12) K#9
         IF (K. EQ. 15) K#9
         IF (K. EQ. 18) K=9
         IF (K.EQ, 13) K=11
         IF (K,EU,16)K#12
GUTO(1,2,3,4,5,6,7,8,9,10,13,16),K
 1
         WHITE(6,405)(X(1),1=1,6)
         RETURN
 2
         WHITE(6,406)(X(1),I=1,6)
         RETURN
         WRITE(6,407)(X(1),1=1,6)
         RETURN
         WHITE(6,408)(X(I),1=1,6)
         RETURN
         \#KITE(6,489)(X(I),I=1,6)
 5
         RETURN
         WRITE(6,410)(x(1),101,6)
 b
         RETURN
 7
         WHITE(6,411)(X(1),181,6)
         RETURN
         WRITE(6,412)(X(1),1=1,6)
 8
         RETURN
         WHITE(6,413)(X(I),I=1,6)
         RETURN
 10
         WRITE(6,414)(X(I),I+1,6)
         RETURN
```

WRITE(6,415)(X(1),I=1,6)

```
RETURN
         WRITE (6,416) (X(1),1=1,6)
10
         RETURN
         HRITE (6,417) (X(I), I#1,6)
19
         RETURN
         FURMAT (3x, 'VOICING', 9x, 3 (3x, F6, 2, 2x, F6, 2))
FURMAT (6x, FRICTIONAL', 4x, 3 (3x, F6, 2, 2x, F6, 2))
405
440
         FURMAT (6X, 'NON-FRICTIONAL', 3(3X, F6, 2, 2X, F6, 2)/)
401
         FURMA: (3x, 1NASALITY1, 8x, 3 (3x, F6, 2, 2x, F6, 2))
446
         FURMAT (6X, 'GRAVE', 9X, 3 (3X, F6, 2, 2X, F6, 2))
444
         FURMAT (6X, 'ACUTE', 9X, 3 (3X, F6, 2, 2X, F6, 2) /)
410
         FORMAT (3x, 15USTENTION1, 6x, 3 (3 Fo. 2, 2x, 66.2))
411
         FURMAT (6x, 1 VUICED1, 8x, 3 (3x, 16 2, 2x, F6, 2))
412
         FURMAT (0x, TUNVUICEUT, 0x, 3 (3x, F6, 2, 2x, F6, 2) /)
413
         FURNAT (3x, 15181LATIUN', 6x, 3 (3x, F6, 2, 2x, F6, 2))
414
         FUHMAT (3x, 14 NAVENESS1, 7x, 3 (3x, F6, 2, 2x, F6, 2))
415
         FUHMAT (3x, 1COMPACTNESS1, 5x, 3(3x, F6, 2, 2x, F6, 2))
410
         FURNAT (3x, +10TALS+, 18x, 3 (3x, F6, 2, 2x, F6, 2))
417
         END
```

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LISTENER SUMMARIEST

SAMPLE TEST RUN

LISTENER	1	SPEAKER	KEY	DOE,	JOHN
		BV	1428	•	
		JE	113A		

NUMBER OF CORRECT RESPONSES.

N	ATTRIBUTE	PRESENT	ABSENT
	VOICING	32.00	29.00
	FRICTIONAL	16.00	13.00
	NON-FRICTICNAL	16.00	16,00
	NASALITY	31.00	30.00
	GHAVE	16.00	13,00
	ACUTE	15,00	15,00
	SUSTENTION	24.00	25.00
	VDICEU	13.00	11,00
	UNVOICED	11,00	14,00
	SIBILATION	31.40	31.80
	VUICED	15,00	16.00
	UNVOICED	10,00	15,00
	GRAVENESS	25.00	29.00
	VUICED	15.00	16.00
	UNVOICED	09,99	13.66
	COMPACTNESS	32.00	29.00
	VOICED	16.00	14,90
	UNVOICED	16.00	15.00

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SAMPLE TEST RUN

=LISTENER	4	SPEAKER	KEY	JONES,	ROBERT
		ΒV	1028		
		JE	113A		

NUMBER OF CORRECT RESPONSES!

MAIN ATTRIBUTE:	PRESENT	ABSENT
VOICING	32,00	10.0.
FRICTIONAL		30,00
NUN-FRICTIONAL	16.00	16.00
	16,88	14,68
MASALITY	30 00	
GRAVE	32.00	31,00
ACUTE	16.00	15,00
20015	10.60	16,00
SUSTENTION		
VOICED	25,00	26,00
	11,06	12.00
UNVUICED	14,00	14,00
SIBILATION	0.2 0.0	•
VOICED	26.00	32,00
UNVOICED	14,00	16,00
OHIOILED	14.00	15,00
GRAVENESS	31.00	00.0.
VUICED		29.00
UNVOICED	16.00	15,00
011702020	15.00	13,00
COMPACTNESS	32.08	10.00
VUICEU		32,00
UNVOICED	16,80	16,40
OHIOTOER	16,04	16,00

SAMPLE TEST RUN LISTENER 1 PERCENT CORRECT WITH GUESSING TRANSFORMATION DUE, JOHN

MAIN	ATTRIBUTES	PRESENT	ABSENT
	VUICING	899.99	81,25
	FHICTIONAL	899,99	62,50
	NUN-FRICTIONAL	899,99	099,99
	NASALITY	93.75	87.50
	GHAVE	99,99	87.50
	ACUTE	87,50	87,50
	SUSTENTION	50.00	56,25
	VUIÇEU	62,50	37.50
	UNVUICED	37,50	75,66
	SIBILATION	93,75	93,75
	VOICED	87.50	099.99
	UNVOICED	099,99	87,50
	GRAVENESS	56,25	81.25
	VOICED	67.50	66.668
	UNVOICED	25,88	62,58
	COMPACTNESS	499.99	81,25
	VOICED	499.99	75.00
	UNVUICED	899,99	87,58
		,	0,420

SAMPLE 16ST RUN LISTENER 2 PERCENT CORRECT WITH GUESSING TRANSFORMATION JUNES, HOBERT

MAIN	ATTRIBUTES	PRESENT	ABSENT
	VOICING	499,99	37,50
	FRICTIONAL	899.99	499,99
	NON-FRICTIONAL	699,99	75.00
	NABALITY	499,99	93,75
	GRAVE	699.99	87.50
	ACUTE	099,99	899,99
	SUSTENTION	.56.25	62,50
	VOICED	37.50	50.00
	UNVOICED	75,88	75.00
	SIBILATION	75,60	000,99
	VOICED	75.00	899,99
	UNVOICED	75,00	899,99
	GRAVENESS	93,75	81.25
	VOICEU	099,99	809.99
	UNVOICED	87,50	62,58
	CUMPACTNESS	409,99	A99,99
	VOICED	899,99	H99,99
	UNVOICED	999,99	60,00
	~··· ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~	,	-42122

DRT MEANS AND STANDARD ERRORS FOR 2 LISTENERS
SYSTEM UNDER TEST: SAMPLE TEST RUN

NUMBER OF SPEAKERS = 2

LISTENER MEAN URT

1 81.25 UOE, JUHN 2 87,50 JUNES, ROBERT

MAIN ATTRIBUTES	PRESENT		ABSENT		TOTAL	
	MEAN	S.E.	MEAN	5,E,	MEAN	\$,E,
V01C1NG	099,99	N.00	84,37	2.21	92,19	1.10
FRICTIONAL	66.669	0.00	81,25	13,26	90,62	6,63
NUN-FRICTIONAL	89, 99	0.00	87,58	8,84	93,75	4,42
NASALITY	96.87	2.21	98,62	2,21	93,75	2,21
GNAVE	W99.99	0.00	87.50	0.00	93,75	Ø,00
ACUTE	93,75	4,42	93,75	4,42	93,75	4,42
SUSTENTION	53.12	2.21	59.37	2.21	56,25	2,21
VOICED	50.00	8.84	43.75	4,42	46.67	2,21
UNVUICEU	55,25	13,26	75,88	0.00	65,62	6,63
SIBILATION	84.37	6,63	96.87	2,21	90.62	2,21
VOICED	81.25	4.42	099.99	0.00	90.62	2,21
UNVUICED	87,50	8,84	93,75	4,42	90,02	2,21
UNAVENESS	75.00	13.26	81,25	8.69	78,12	6,63
VUICEU	93.75	4.42	499.99	0.00	96.87	2,21
UNVUICEU	50,25	22,10	62,50	0,00	59.37	11,05
COMPACINESS	099.99	0.00	90.52	6.63	95.31	3,31
VUICED	999.99	0,00	87.50	8.84	93.75	4,42
UNVUICED	99,99	8,48	93,75	4,42	96,87	2,21
TOTALS	84,90	1,64	83,85	2,58	84,37	2,21

- MEAN = 84,37 + TOTAL DRT SCORE; - 5,E, = 2,21

TOTAL NUMBER OF TEST ITEMS # 768

DHT MEANS AND STANDARD ERRORS FOR 2 LISTENERS

SYSTEM UNDER TEST! SAMPLE TEST RUN

NUMBER OF SPEAKERS = 2

LISTENER HEAN DRT

81.25 87.50 DOE, JUHN JONES, ROBERT

MAIN ATTRIBUTE:	PRESENT		ABSENT		TUTAL	
	MEAN	5, E,	MEAN	3,ε,	MEAN	5,Ε,
ANICING	899,99	0.66	84.37	2,21	92,19	1.16
FHICTIONAL	099,99	0.40	81,25	13.26	90.62	6,63
NUM-FRILTIONAL	099,99	0,00	87,50	8,84	93,75	4,42
NASALITY	96.87	2.21	98.62	2.21	93,75	2.21
GRAVE	099,99	0.66	67.50	0.00	93.75	0.06
ALUTE	93.75	4,42	93,75	4,42	93,75	4,42
SUSTENTIUN	53,12	2.21	59.37	2.21	56.25	2,21
VUICEU	50.00	8.84	43.75	4.42	46,87	2.21
UNVUILEU	56,25	13,26	75.00	0.00	65,62	6,63
SIBILATION	84.37	6.63	96.87	2.21	90.62	2.21
VUICED	81,25	4,42	099.99	0.00	90.62	2.21
UNVUILED	87,58	8,84	93,75	4,42	90,62	2,21
GRAVENESS	75.00	13,26	81,25	9.48	76,12	6.63
VUICEO	93.75	4,42	899.99	0.00	96.67	2,21
ANADICED	56,25	22.18	62,50	8,00	59,37	11,05
LUMPACTNESS	89.99 8	0.06	98.62	6,63	95,31	3.31
AOICED	99.99	0.00	87.50	8.84	93,75	4,42
UNVUICEU	099,99	0.00	93.75	4,42	96.87	2,21
IUTALS	84.90	9.00	83,85	U,08	84,37	2,21

TOTAL DET SCORES

TUTAL NUMBER OF TEST ITEMS .

SAMPLE TEST RUN

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A Consideration of the second of the control of the second
NUMBER LISTENERS . 2 Number Speakens . 2

LISTENENI DUE, JOHN • SPEAKER! • BY

NUMBER OF INCURRECT RESPONSES!

MIN	ATTRIBUTE	PRESENT	ABSENT
	VOICING	u	2
	FRICTIONAL	•	* 2
	NON-FRICTIONAL	i	ě
	NASALITY	1	2
	GRAVE	ě	-,
	ACUTE	ĭ	i
	SUSTENTION	5	•
	VOICED		3
	UNVOICEQ	2 3	2
	SIBILATION	1	
	VOICED	•	1
	UNVOICED	ė	9 1
	GRAVENESS	4	
	VOICED	- ,	2
	UNVOICED	3	0 2
	COMPACTNESS	0	
	VOICED	-	3_
	UNVOICED	0	2
		6	1

SAMPLE TEST RUN

NUMBER LISTENERS = 2 NUMBER SPEAKERS = 2

LISTENERS DUE, JOHN . SPEAKERS . JE .

NUMBER OF INCORRECT RESPONSES:

MAIN	ATTRIBUTES	PRESENT	ABSENT
	VOICING	8	1
	FRICTIONAL	0	i
	NON-FRICTIONAL	0	ė
	NASALITY	Ø	6
	GRAVE	ø	Ű
	ACUTE	v	0
	SUSTENTION	3	4
	VOICEO	1	•
	UNYOICED	ž	8
	SIBILATION	Ø	0
	VUICED	e	ĕ
	UNVOICED	Ú	ø
	GRAVENESS	3	1
	VUICED	a	
	UNVOICED	3	í
	COMPACTNESS	8	e
	VUICED	ě	้อ
	UNVOICED	ă	<u> </u>

NUMBÉR LISTENERS # 2 Numbér speakens # 2

LISIENERI JUNES, KOUERT - SPEAKER; - BV

NUMBER OF INCORRECT RESPONSES!

ATTHIBUTES	PRESENT	ABSENT
VOICING	-6	9
FRICTIONAL	u	ē
NON-FHICTIONAL	ø	ě
NASALITY	0	u
GRAVE		ē
ACUTE	8	ø
SUSTENTION	3	4
VOICEU		
UNVOICED	ŭ	2 2
SIBILATION	. 2	0
VOICED		ั้ง
UNVOICED	ÿ	ě
GRAVENESS	4	2
VUICED		
UNVOICED	ĕ	0 2
CUMPACTNESS	A	0
		້ຄ
		D
	FRICTIONAL NON-FHICTIONAL NASALITY GRAVE ACUTE SUSTENTION VOICED UNVOICED VOICED UNVOICED GRAVENESS VOICED	VOICING FRICTIONAL NUN-FHICTIONAL NASALITY GRAVE ACUTE SUSTENTION VOICEU UNVOICED UNVOICED UNVOICED GRAVENESS VUICED UNVOICED UNVOICED UNVOICED UNVOICED UNVOICED GRAVENESS VUICED UNVOICED UNVOICED UNVOICED GRAVENESS VOICED UNVOICED GRAVENESS VOICED GRAVENESS VOICED GRAVENESS VOICED GRAVENESS VOICED

NUMBER LISTENERS # 2 NUMBER SPEAKERS # 2

LISTENER: JONES, ROBERT - SPEAKER: + JE

NUMBER OF INCORRECT RESPONSES:

AIN	ATTRIBUTES	PRESENT	ABSENT	
	VOICING	•	2	
	FRICTIONAL	0	9	
	NOH-FRICTIONAL	Ø	2	
	NASALITY	¥	1	
	GRAVE	8	i	
	ACUTE	0	0	
	SUSTENTION	4	2	
	VOICED	2	2 6	
	UNVOICED	2	6	
	SIBILATION	2	•	
	VOICED	8	8	
	UNVOICED	2		
	GRAVENESS	1	1	
	VOICED		8	
	UNVOICED	k	1	
	COMPACTNESS	•	0	
	VOICED	9	9	
	UNVOICED	•	9	

NUMBER LISTENERS # 2 NUMBER SPEAKERS # 2

FOR LISTENERS DOE, JOHN

SPKK SCORE

6v 75.00 JE 87.50

MAIN ATTRIBUTE:	PRESENT		ABSENT		TOTAL	
	MEAN	S.E.	MEAN	3,E,	MEAN	s,£,
VOICING	099.99	0.00	81,25	4,42	90,52	2.21
FIILTIONAL	899,99	0.00	62,50	8,84	81,25	4,42
NUN-FRICTIONAL	899,99	9,00	899,99	0,00	999,99	0.00
NASALITY	93.75	4,42	87.50	8,84	90,62	6,63
GHAVE	899.99	6.60	87.50	8,84	93,75	4,42
ACUTE	87,58	8,84	87,50	8,84	87,50	8,84
SUSTENTION	50.80	8.84	56,25	4,42	53,12	2,21
VUICED	62,50	8,84	37.50	26,52	50,86	8,84
UNVUICED	37,50	8,84	75,00	17,68	56,25	13,26
SIBILATION	93.75	4.42	93,75	4,42	93,75	4,42
VOICED	87,50	8.84	099,99	0.00	93.75	4,42
UNVOICED	666.668	0,00	87,50	8,84	93,75	4,42
GRAVENESS	56.25	4.42	81.25	4,42	68,75	4,42
VUICED	87.58	8.84	099.99	0,60	93,75	4,42
UNVUICED	25,66	0,00	62,50	8,84	43,75	4,42
COMPACTNESS	899.99	0.00	81,25	13,26	90,62	6,63
VOICED	899.99	0.00	75,00	17,68	87,50	8,84
UNVUICEU	99,99	0,00	87,58	8,84	93,75	4,42
TOTALS	82,29	3,68	80,21	5,16	81,25	4,42

TOTAL DRY SCURE!

NUMBER LISTENERS # 2 NUMBER SPEAKERS # 2

FUR LISTENER: JONES, ROBERT

SPKH SCORE

by 68.54

JE 86.46

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MAIN ATTRIBUTES	PRESENT		ABSENT		TOTAL	
	HEAN	3,Ε,	HEAN	3.E,	HEAN	8,E,
VOICING	899,99	0.88	87,50	8,84	93,75	4,42
FRICTIONAL	999,99	Ŭ. V	699,99	9.06	999,99	0.00
NON-FRICTIONAL	899,99	6,00	75,80	17,68	87,58	6.84
NASALITY	899,99	0.90	93,75	4,42	96,87	2,21
GHAVE	899,99	6.00	87.58	8,84	93,75	4,42
ACUTE	899,99	0,90	000,00	0,00	66.568	0.00
SUSTENTION	56.25	4.42	62,58	8,84	59,37	2,21
VOICED	37,50	8.84	56.00	0.00	43,75	4,42
UNVOILED	75,88	17,68	75.00	17.68	75.00	8.48
SIBILATION	75,00	0.00	899,99	0,00	87,50	0,00
VOICEU	75,66	17.68	899.99	9.99	87.50	8.84
UNVUICED	75,80	17,58	699,99	0,80	87,50	8,84
GRAVENESS	93.75	4.42	81,25	4,42	87,50	0.00
VUICED	809.99	Ď. 8 8	099.99	0.00	099.99	0.00
UNVUICED	87,58	8,84	62,50	8,84	75,00	9.40
COMPACTNESS	099.99	0.60	099,99	0.00	000,99	0.00
VDICEU	899.99	ĕ.08	899.99	0,00	899.99	5.00
UNVUICED	999,99	0,00	699,99	0,00	899.99	0.00
TOTALS	87,50	1.47	87,50	0.08	87,56	0.74

TOTAL DRI SCORES .

• MEAN # 87,58 • • * \$.E. * 9,74 •

NUMBER LISTENERS = 2 NUMBER SPEAKERS = 2

FUR SPEAKERS BV .

LISTENER SCORE
DDE, JOHN 75.00
JUNES, ROBERT 88,54

MAIN ATTRIBUTE;	PRESENT		ABSENT		TOTAL	
	MEAN	8.E,	MEAN	S,E,	MEAN	S,E,
VOICING	899,99	0.80	87,50	8,84	93,75	4,42
FRICTIONAL	099,99	0.00	75,80	17,68	87 . 50	8.84
NUN-FRICTIONAL	099,99	0,00	609,99	0.99	899,99	0.00
NASALITY	93.75	4,42	87.50	8.84	98,62	6,63
GRAVE	099.99	0.80	87,50	8,84	93,75	4,42
ACUTE	87,50	8,84	87,50	8,84	87,50	8,84
SUSTENTION	50.00	8.84	56.25	4,42	53,12	2,21
VOICED	37,50	8,84	62.50	8,84	50.80	8,84
UNDICED	62,50	26,52	50.00	0.00	56,25	13,26
SIBILATION	81.25	4.42	93.75	4,42	87.50	0.00
VOICED	62,50	8,84	899.99	0,00	81.25	4,42
UNVOICED	099,99	0,00	87.50	8,84	93,75	4,42
GRAVENESS	75.00	17,68	75.00	0.00	75.00	8,84
VOICED	87,58	8,64	899.99	9.80	93,75	4.42
UNVOICEU	62,50	26,52	50,80	0.00	56,25	13,26
COMPACTNESS	999.99	0.00	81.25	13,26	98.62	6,63
VUICED	899.99	9.08	75,00	17.68	87,58	8,84
UNVOICED	99.99	0,06	87,50	8,84	93,75	4,42
TOTALS	83,33	4,42	40,21	5,16	81,77	4,79

TOTAL ORT SCORES

• MEAN \$ 81,77 • • 8.E, \$ 4,79 •

| 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000

NUMBER LISTENERS = 2 NUMBER SPEAKERS = 2

FUR SPEAKER! JE .

LISTENER SCORE

OUE, JOHN B7,58
JUNES, ROBERT B6,46

MAIN ATTRIBUTE:	PRESENT		ABBENT		TOTAL	
	MEAN	3,E,	MEAN	3, £,	MEAN	5,E,
VOICING	899.99	6.88	81.25	4,42	90.62	2.21
FRICTIONAL	899.99	6.00	87,50	8,64	93,74	4,42
NON-FRICTIONAL	099,99	0,00	75,00	17,68	87,58	8,84
NASALITY	899.99	8.88	93,75	4.42	96.87	2,21
GHAVE	099.99	0.00	87.50	8.84	93.75	4,42
ACUTE	099,99	0,00	899,99	0.00	099.99	0.00
SUSTENTION	56,25	4,42	62,50	8.84	59.37	2.21
VUICEO	62,50	8.84	25.00	17,68	43.75	4.42
UNVOICED	50.00	0,00	899,99	0.00	75.00	0.00
SIBILATION	87,50	8,84	899.99	0.00	93,75	4.42
VOICED	899.99	8,69	899,99	0.00	99.99	0.00
UNADICED	75.00	17,68	009,99	0.00	87,50	8.84
GRAVENESS	75,88	8.84	87,58	0.00	81.25	4.42
VOICEU	899.99	0.00	899.99	9.00	899.99	0.00
UNVOICED	50,00	17,68	75,88	0.00	62,50	8,84
COMPACTNESS	899,99	0.00	899.99	0.00	899.99	0.80
VUICED	899.99	9.00	699,99	0.00	899,99	0.00
UNVUICEU	499,99	0.48	899,99	0.00	66.669	0.00
TOTALS	86.46	0,74	87,50	0,00	36,98	0.37

TOTAL DET SCORET .

* MEAN # 66,98

• 5,E, = 0,37

NUMBER LISTENERS = 2 NUMBER SPEAKERS = 2

CUMBINED RESULTS . STANDARD ERRORS ACROSS SPEAKERS AND LISTENERS

MAIN ATTRIBUTES	PRESENT		ABSENT		TOTAL	
	MEAN	8,E,	MEAN	3,8,	MEAN	8,E,
VOICING	999,99	6.60	84.37	5.16	92.19	2.59
FRICTIONAL	899.99	0.00	81,25	10,36	90,62	5.18
NON-FRICTIONAL	899,99	0,96	87,50	10,83	93,75	5,41
NASALITY	96,87	2,71	98,62	5,18	93.75	3,83
GHAVE	899,99	0.88	87.50	6.25	93.75	3,12
ACUTE	93,75	5,41	93,75	5,41	93,75	5,41
SUSTENTION	53,12	5.18	59.37	5,18	36,25	2.21
VOICED	50,00	8.84	43,75	13.62	46.87	5,18
UNVUICED	56,25	13,62	75,00	12,50	65,62	8,12
SIBILATIUN	84,37	5,18	96.87	2,71	90.62	2.71
V GICED	81,25	10.36	699.99	0.00	90.62	5,18
UNVUICEU	87,50	10,83	93.75	5,41	90,62	5,18
GRAVENESS	75,00	9.68	81.25	3,12	78.12	5.18
ANICFO	93.75	5.41	090.09	0.00	96.87	2.71
NAA1CED	55,25	16,24	62,50	6,25	59,37	8,12
COMPACTNESS	099,99	0,00	90.62	8,12	95,31	4.00
VOICEU	099.99	0.00	87.50	10.83	93. 5	5,41
UNVUICED	999,99	0,00	93,75	5,41	96.87	2,71
TOTALS	84,99	2,37	63,85	3,16	84,37	2,73

Appendix C

Diagnostic Rhyme Test Scoring Software and Sample Printout PDP-11 Implementation

```
++ RSX=11H VH3 ++ 21=MAR=7R 13147159 DF#1(28#,29#)XXX.FTN;171
++ RSX=11H VH3 ++ 21=MAR=78 13147159 DF#1(28#,29#)XXX.FTN;171
++ RSX=11H VH3 ++ 21=MAR=78 13147159 DF#1(28#,29#)XXX.FTN;171
```

Clade and the same

" 7777 11 11 11 ø N N N N Ŧ 11 1 1 Ť 1 1 111

```
++ R8X+11M V03 ++ 21=MAR+78 13147150 DF01[200,200]XXX,FTNJ171
++ R8X+11M V03 ++ 21=MAR+78 13147150 DF01[200,200]XXX,FTNJ171
++ R8X+11M V03 ++ 21=MAR+78 13147150 DF01[200,200]XXX,FTNJ171
```

```
C
         DIMENSION ISITS(16), IPACK(4)
         DIMENSION ISYS(4), INDUST(4), ISPK(2), ILISTK(4),
     X1COL1(29), ICOL2(29)
         DIMENSION IEQUIV(74)
         DIMENSION JALPH(26)
         DIMENSION NLID(23), IERR(23), KEYN(12), KEYL(12), KSPK1(12)
         DIMENSION KSPK2(12), NAME (4), LSYS (2), IMEAD (38)
         EQUIVALENCE (IRECNO, TEQUIV())). (IPANO, TEQUIV(2)).
     x(1848(1), IEQUIV(3)), (IMDLST(1), IEQUIV(7)), (ISPK(1), IEQUIV(11)),
     x(ILISTN(1), IEQUIV(13)), (ICOL((1), IEQUIV(17)), (ICOL((1), IEQUIV(46))
         COMMON/PAGE/IPAGE (46,54)
         COMMON/ERRORS/IAHANT (54)
         DATA NHAX/74/
     OATA IRITS/#1,#2,#4,#10,#20,#40,#100,#200,#400,#1000,
x*2000,#4000,#100000,#20000,#40000,#100000/
         DATA NAME(1) . NAME(2) . NAME(3) . NAME(4) /2HZ., R, R, R/
         DATA NAMEC/2HC./
     DATA K114,K118,MASK,MASK1,18LNK
X/#114,#118,#377,#77,2H /
         DATA IGNORE, ISTART, ISTOP, IDROP, IENOFL
     x/"1+monn,"(apan),"(annn2,"1annn3,"(annn1m/
         DATA TALPH(1), TALPH(2), TALPH(3), TALPH(4), TALPH(5),
     x Talph(6), Talph(7), Talph(8), Talph(9), Talph(10),
     X TALPH(11), TALPH(12), TALPH(13), TALPH(14), TALPH(16), TALPH(16),
     x TALPH(17), TALPH(18), TALPH(19), TALPH(20), TALPH(21), TALPH(22),
     X IALPH(23), IALPH(24), IALPH(25), IALPH(26)
     X /SMA, SMB, SHC, SMD, SHE, SHP, SHG, SHH, SHS, SHJ, SHK, SHL, SHM, SHN,
     X 1HO, 1HP, 1HQ, 1HR, 1H8, 1HT, 1HU, 1HV, 1HW, 1HX, 1HY, 1HZ/
         DATA NLID
     x/22,4154,9339,4923,1277,4496,6854,4667,3345,5154,1529,7121,5125,
     ¥4866,7356,2258,5486,9463,9557,8178,5348,9849,6#84/
        DO 50 KK-1,30
         THEAD (KK) . TOLNK
         IERR (KK) ...
 58
         00 49 KH1,54
         IANANT (K) BR
         REDREPOS!
         RRSPSOR.
         IRECHOOR
         10PGNO=#
         IPTTF1=1
         CALL ASSIGN(3, 'DFG1')
         CALL ABBIGN(4, 'LPMI')
         CALL ABBIGN(5, 'TIE')
         CALL ASSIGN(A, TTIET)
C
         WRITE (6,197)
 197
         FORMAT (/1HB, 'ENTER DATE OF TEST DO-MMM-YY (15-NOV-77) 11)
         READ (5, 571) ( IMEAD (KK) , KK = 1, 5)
         FORMAT (4A2, A1)
 571
         WRITE (6, 672) (IHEAD (KK), KK +1, 8)
 572
         FORMAT(1x, THIS IS WHAT YOU SAID ... 1,442,41)
         WRITE (6,198)
         FORMAT (/1x, TENTER HEADER INFO... ASMI)
 190
         READ (5, 189) (THEAD (KK), KK+6,34)
 189
         FORMAT (25A2)
 191
         FURMAT(I1)
         WRITE (8,192)
         FORMATI//IX, 1444COPY TO DISKY, TYPE N FOR NO. 1 FOR YES!
         READ (5, 191) 1POP11
```

```
WRITE(6,193)
          PORMATE//1X, ****COPY TO PRINTER? .. TYPE 8 FOR NO; 1 FOR YES!)
 193
          READ (5, 195) IPOPLP
 195
          FORMAT (IR)
          IREPFOR
          IRESTOR
          IIREST-IFEST
          WRITE(6,199)
          FORMAT (/1x, ENTER MLISTENERS, MSPEAKERS, MSYSTEM., 121214),
      X/1X, FOR EXAMPLE 1888 1184 FOLLOWED BY CARRIAGE RETURN!)
          READ(6,292)NL,N8,L848(1).L848(2)
          FORMAT (12,12,42,42)
 292
          NAME (2) 0L848 (2)
          DECODE (4,1990,L3Y3) 13Y8
          FORMAT (411)
 1996
          IF(IPOP11.EQ.1)CALL ASSIGN(3.NAME)
          DO 318 KO1, NS
          WRITE (0, 293) K
       FORMAT(1x, TENTER KEY AND SPEAKER (E,G, 119288V) FOR SPEAKER (. 12)
 293
          READ (5, 204) KEYN(K), KEYL (K), KSPKS (K), KSPK2(K)
          FORMAT (13, A1, A1, A1)
  294
  310
          CONTINUE
          WRITE(8,295) (KEYN(K), KEYL(K), KSPK1(K), KSPK2(K), K01, N8)
PORMAT(///1x, 'CHECK THE KEYS'..'//(1x, I3, A1, A1, A1))
PAUSE '+++++ READY TO GO '+++++
  205
          KLCTROB
'C
          CONTINUE
          CALL ROPAGE
C
  1001
          CONTINUE
          IRECHOSIRECNO+1
C
           IPGNO ..
          DO 2 K=1,4
           IF(IPAGE(1,K+58)'EQ,1)IPGNO+IPGNO+K
           CONTINUE
           IF (IPGNO.EQ. M) WRITE (6,296)
           FORMAT (1X, 1EOF. ENTER # TO GO OR 1 TO STOP!)
1F(IPGNO, EQ. #) READ (5, 191) ISH
  296
           IF (IPGNO GT, 4) PAUSE IBAD PAGEN . FIXERESUME!
           IF(IPGNO.GT.4)GN TO 1
IF(((IBW'AND'1).EQ'1).AND.IPGNO.EQ'.0)GO TO 9999
IF(IPGNO.EQ.0)GO TO 1
           IF(TREST'EQ. 1)GO TO 21
IF(((IPGNO-IOPGNO)'EQ.1)'OR.((IPGNO-IOPGNO).EQ.-3))GO TO 21
           IF (IPGNO'EG, TOPGNO)GO TO 22 HRITE (6, 198) TUPGNO, IPGNO
           FORMAT (/1x, 18EQUENCE ERROR PG 1,11,1 TO 1,11)
   198
           PAUSE ILOAD RIGHT PAGE, RESUME!
           GO TO 7843
           CONTINUE
   22
           FORMAT (1x, 100 YOU WANT TO END THE RUNT 8=N.1=Y1)
   471
           WRITE(8,194)
           #RITE(8,471)
           READ (5, 191) 10FLG
           1F(10FLG.ED.1)GO TO 9999
           FORMAT (14, INEDUNDANT PAGE IGNORED.1.1)
   194
           GO TO 7883
           CONTINUE
   21
           IRESTOR
           10PGNO-IPGNO
            IF (IPGNO', NE, 1) GO TO 41
```

```
C
        -KLCTR#KLCTR+1
¢
         ID$Y$=1888-15Y8(1)+188+18Y8(P)+18+18Y8(3)+18Y8(4)
C
         ITEMPEMOD(KLCTR+1,N8)+1
         INDLST(1)=KEYN(ITEMP)/100
         INOLST (2) = MOD ( (KEYN (ITEMP) / IA) . 14)
         INDLAT (3) . HOD (KEYN (ITEMP), 10)
         INDLST (4) = KEYL (ITEMP) . AND . MASK1
¢
         IDWLIS-198+IWDLST(1)+18+IWDLST(2)+IWDLST(3)
C
         DD 3882 KK#1.4
         ILISTN(KK) #8
         DO 3882 K#1,18
         IF (IPAGE (KK+5, K+36), EQ. 1) ILISTN (KK) #K+1
 3882
         CONTINUE
         IDLIS=1999+ILISTN(1)+199+ILISTN(2)+19+ILISTN(3)+ILISTN(4)
C
         ISPK(1) #KSPK1(ITEMP).AND', MASK1
ISPK(2) #KSPK2(ITEMP).AND', MASK1
c
 9180
         CONTINUE
         ITEMP=NLID(1)+1
         DO 9110 KK#2, ITEMP
         IF (IDLIS'EQ, NLID (KK)) GO TO 9244
 9118
         CONTINUE
         WRITE (6,9190) IDLIS
         FORMAT (/1x, 'HEADER ERROR' BAD LISTENER TO '. 14/1x,
      XIENTER CORRECTED ID ...
                                  EXAMPLE:56951)
         READ (5, 9893) (ILISTN (ITEMP), ITEMP = 1,4)
         FORMAT (411)
 9893
         IDLIS=1988+ILISTN(1)+188+ILISTN(2)+18+ILISTN(3)+ILISTN(4)
         GO TO 9188
 9238
         CONTINUE
         IF (IERR (KK) . LT. M) IERR (KK) . M
 41
         CONTINUE
C
         DO 5 KK-1,29
         ISUMBO
         IF (IPAGE (KK+14,8),EQ.1) ISUMatsum-4
         IF (IPAGE (KK+14,9), EQ.1) ISUM#ISUM+3
IF (IPAGE (KK+14,1F), EQ.1) ISUM#ISUM+P
         IF (IPAGE (KK+14,11), EQ, 1) ISUMOISUM-1
         IF (IPAGE (KK+14,13) .EQ. 1) ISUM#ISUM+1
         IF (IPAGE (KK+14,14) .EQ,1) | SUM+18UM+2
         IF (IPAGE (KK+14,18) .EQ.1) ISHHOISUM+3
         IF (IPAGE (KK+14,16) .ED,1) | SUM | ISUM+4
         IF (IPAGE (KK+14,3) . EQ. 1) ISHHOLISUM
         ICOL1 (KK) = HOD (KK, 2)
         IF (ISUM.LT. 0) ICOL1 (KK) #0
         IF (ISUM, GT. 0) ICOL 1 (KK) +1
         RRSPSURRSP3+1
         IF (IBUM, NE. 0) GO TO SPI
         RBDRSP#RBDRSP+1.
         ITEMP=NLTD(1)+1
         DO 51 K=2, ITEMP
         IF (IDLIS'ED. NLIU(K)) TERR (K) #TERR (K)+1
 51
         CONTINUE
```

```
561
         CONTINUE
5
        -CONTINUE
         DO 6 KK#1,29
         IF (IPAGE (KK+14,39)',EQ.1) 18UH#18UH=4
          IF (IPAGE (KK+14,4P),EQ.1) ISUH-19UH-3
         IF (IPAGE (KK+14,41),EQ,1)18UM#18UM#2
          IF (IPAGE (KK+14, 42) .EQ. 1) ISUM#ISUM#1
         IF (IPAGE (KK+14, 44) . ED. 1) 18UM#18UM+1
          IF (IPAGE (KK+14,48), EQ. 1) 18UM=18UM+2
          IF (IPAGE (KK+14, 46) .ED.1) 18UM=18UM+3
          IF (IPAGE (KK+14,47) .EQ. 1) 18UM#ISUM+4
          IF (IPAGE (KK+14,5P).EQ.1) TSUMO-ISUM
          ICOFS(KK) #HOD (KK'S)
          IF (ISUM_LT_0) ICOL2(KK)=0
          IF (ISUM.GT.M) ICOL2 (KK) =1
          R#SPS=RRSPS+1.
          IF (ISUM. NE. 0) GO TO 601
          RBORSPORBORSP+1.
          ITEMPONLID(1)+1
         DD 52 K-2, ITEMP
          IF (IOLIS.EG, NLID (K)) IERR (K) # TERR (K) +1
 52
          CONTINUE
 681
          CONTINUE
 6
          CONTINUE
          IF (IPOPLP.EQ.A) GO TO JANE
          WRITE(4,90) IPGNO, 108YS, TALPH(15PK(1)), TALPH(15PK(2)),
      XIDLIS, IONLIS, IALPH(IMDLST(4))
         FORHAT (1H1/56X, 5HPAGE , 11, 5H OF 4/
      x 1x, 8HSYSTEME , 14/1x, 8HSPEAKRE , 241/1x,
      XBHLISHERE . 14/14,8HWDLISTE . 13.A1////)
         DO 7 Ke1,29
         IF ((ICOL1(K) EQ.A) AND ((ICOLP(K) EQ.A)) WRITE(4,91)K,K
IF ((ICOL)(K) EQ.A) AND ((ICOL2(K) EQ.1)) WRITE(4,92)K,K
IF ((ICOL)(K) EQ.1) AND ((ICOL2(K) EQ.A)) WRITE(4,93)K,K
IF ((ICOL)(K) EQ.1) AND ((ICOL2(K) EQ.1)) WRITE(4,94)K,K
          FORMAT (5x, 12, 3H+++, 10x, 4HX
                                              ,16X,4HX
                                                            ,10x,3H+++,12)
 92
          FORMAT(5x, 12, 3H+++, 10x, 4HX
                                              ,16X,4H
                                                           X.10X.3H+++,12)
         FORMAT (5x, 12, 3H ..., 18x, 4H
                                                           ,1PX,3H+++,12)
 93
                                             Y,16X,4HX
 94
         FORMAT (5x, 12, 3H+++, 10x, 4H
                                             X,16X,4H
                                                           x, (AX, 3H+++, 12)
 7
          CONTINUE
C
 7001
         CONTINUE
C
          CONTINUE
          IF (IPOP11.NE.1)GD TO 7803
          IF (IFTTF1, EQ. 0. OR, IIREST, EQ. 1) GO TO 918
          IFTTFIER
          WRITE(3) NL, NS, (IHEAD(K), K#1, S#)
          WRITE(S)NL,NR, (IHEAD(K),K=1,30)
          CONTINUE
          WRITE(3) (IE JIV(K), K=1, NMAX)
          DO 3781 Km: .
          IPACK(K)=0
 3701
         00 3702 K=1,3
00 3702 NSIT=1,16
          IF (IEOUIV (16+K+NBIT) .NE.e) IPACK(K) = IPACK(K), OR. IBITS (NBIT)
 3782
          CONTINUE
          00 3783 K#4,4
          DO 3783 NBIT-1,18
          IF (IEQUIV (16+K+NPIT) , NE, P) IPACK(K) = IPACK(K), OR. IBITS (NBIT)
```

```
CONTINUE
 3783
         WRITE(1) (IEQUIV(K), Ke1.16), (IPACK(K), Ke1, 4)
C
 7003
         CONTINUE
C
         GO TO 1
 9999
         CONTINUE
         RTEMP+ (RBDRSP/RRSPS) +198.
         WRITE(6, 298) RBDRSP, RRSPS, RTEMP, INSYS
 299
         FORMAT (/1X, 1 BAD MARKS, MARKS X ... 1, 77, 8, 1X, F7, 8, 1X, F5, 1/
      ITEMPONLID(1)+1
         DO 53 KK=2, ITEMP
         RTEMPO(IERR(KK)/RHDRSP)+100.
IF (IERR(KK),GE,A)HRITE(6,201)NLID(KK),IERR(KK),RTEMP
         FORMAT (1x, 'LISTENER ', 14.5x, 14. | ERRORS', 2x, | x1, F5.1)
 201
 53
         CONTINUE
         WRITE(6,9898) (MINS(IAWANT(K),9),K=1,54)
         FORMAT (1K, 10 (511, 1K), 411)
         STOP 1+++ FINISHED +++1
         END
         SUBROUTINE ROPAGE
         CIMENSION ICOM (3)
         COMMON/CHARB/ICHARB (500)
         COMMON/IDPAGE/IARRAY (4000)
         DATA ICOM/*201, *005, *021/, ICR/*218/, IEP/*012/
         IBASE# (((*176588, AND, *77777) + *68888) /2) +1
C
         CALL WAIT (4,2, MOUNHY)
C
 188
         CONTINUE
         IARRAY (IBASE+2) = "21
         IARRAY (IRASE+8) = 21
         OLOTIMOSECHOS (#.)
         00 183 K=1,3
 101
         CONTINUE
         IF((IARRAY(IBASE+2), AND, "288), NE', "888) GO TO 182
IF((SECNDS(8,) = OLDTIM)', LT, 151 GO TO 181
         WRITE (6, 1888)
         FORMAT(1X, 1+++ OMR NOT RECEIVING, YOU HUST RESET OHR 1)
         PAUSE TRES TO CONTINUE!
         GO TO 188
         CONTINUE
 192
         IARRAY (IBASE+3)=ICOM(K)
 183
         CONTINUE
C
         INYSI
         OLDTIMASECNOS (A.)
200
         CONTINUE
         IF ((IARRAY (IRASE+#) .AND. "2##) .EQ'. "###) GO TO 3##
         ICHARB (INX) # IARRAY (IBASE+1) . AND . #377
         TIME . SECNDS (A.)
         DLDTIMETIME
         IF ((ICHARB(INX).EG.ICR).AND.(INX.GT.1).AND. (ICHARB(INX-1)
     Y.EG. IEP) ) GO TO 400
         INX#INX+1
         GO TO 288
 380
         CONTINUE
         IF ((BECHOS (R.) = OLDTIM) LE. 11'.) GO TO 288
         WRITE (6,1AN1)
```

```
FORMAT (1x, 1+++ OHR NOT SENDING EP/CR, YOU MUST RESET OHR AND RE
     KREAD THE PAGE!
        PAUSE TRES TO CONTINUE!
        GD TO 188
        CONTINUE
488
        CALL SCAN(IERRFG, INX)
        IF (IERRFG.EQ.1)GO TO 188
        RETURN
        END
        SUBROUTINE SCAN(IERRFG. INX)
        DIMENSION IBITS(A)
        COMMON/CHARB/ICHARB (599)
        COMMON/PAGE/IPAGE (46,54)
        COMMON/ERRORS/IAWANT (54)
        DATA INITS/H49, "29, "19, "4, "2. "1/
¢
        IVAL(K) SICHARB(K) .AND . #77
5
        DO 99 K=1,46
        DO 99 KK#1,54
         IPAGE (K,KK) =P
 99
C
         IRONSOI
         NPTR . 8
 100
         CONTINUE
         NPTRENPTR+1
         IF (ICHARB (NPTR) .EO. "215)GO TO 299
         IF (NPTR.LT. INX) GO TO 188
         STOP ITHPOSSIBLE!
         CONTINUE
 240
         MPTRONPTR
 281
         CONTTNUE
         MPTREMPTR+1
         IF (ICHARR (MPTR) .EG'. #215) GO TO 388
         IF (MPTR.LT. INX) GO TO 201
         STOP TIMPOSSIBLE
         CONTINUE
  SAB
         Na((MPTR-NPTR)-1)/19
         NPTRENPTR+1
         DO SAL, KKKEL.N
         ITEMPOTVAL (NPTR+10+(KKK-1))
          IF(ITEMP'GT. IROW) GO TO 3001
          IAHANT (IROW+1) BIAWANT (IROW+1)+1
          GO TO 381
          CONTINUE
  3001
          IROWEITEMP
          DO 381 Ke1,9
          00 381 KK#1,6
          IF ((IBITS(KK), AND, ICHARB (MPTR+10+(KKK+1)+K)) NE. A)
       XIPAGE(IRON+1,6+(K+1)+KK)=1
          CONTINUE
  301
          NPTR BMPTR-1
          IF (HPTR.LT. INX) GO TO 100
          IERRFG . 3
          NROWERER
          00 481 Ka15,43
          DO 488 KK#1,54
          IF (IPAGE (K, KK) .EQ. 1) GO TO 481
          CONTINUE
   488
          NROWER = NROWER+1
          CONTINUE
   461
          IF (NAOHER.LE'. 1) RETURN
           WRITE (6, 1999) NROWER
```

一般のは、一般のでは、一般のでは、一般のでは、一般のでは、一般のでは、一般のでは、一般のでは、一般のでは、一般のでは、一般のでは、一般のでは、一般のでは、一般のでは、一般のでは、一般のでは、一般のでは、

INDS FORMAT(1x, '*** 1, 12, ' MISSED RESPONSE ROWS ON THIS PAGE.'/

X1X, TYPE IN A 1 TO REREAD THE PA (1, 1, 1, 1)

READ(5, 1 A 1, 1) TEMP

1881 FORMAT(11)

IF(ITEMP_EQ_8) RETURN

PAUSE 'RES TO CONTINUE'

IERRFG=1

RETURN
END

学院の関係の対象のでは、1960年の1960年の1960年の1960年の1960年の1960年の1960年の1960年の1960年の1960年の1960年の1960年の1960年の1960年の1960年の1960年の19 1960年の1960年の1960年の1960年の1960年の1960年の1960年の1960年の1960年の1960年の1960年の1960年の1960年の1960年の1960年の1960年の1960年の1960年の19

+ R8X+11M V83 + 21+MAR+78 13148154 DF#1 (2##, 2##) XFER, FTN 1544 + R8X+11M V#3 + 21+MAR+78 13148154 DF#4 (2##, 2##) XFER, FTN 15#4 + R8X+11M V#3 + 21+MAR+78 13148154 DF#1 (2##, 2##) XFER, FTN 15#4

X X FFFFF EEEE RRRR
X Y F E R R
X X F E R R
X X F E R R
X X F E R R
X X F E R R
X X F E R R

TTTTT ,, 55555 5 " FFFF 5 000 N N N 11 5 88 T P 4 " Ť 5 9 N , 5 555

++ R\$X=11M V83 ++ 21=MAR=78 13148154 OFFI (288,288) XFER, FTN1584 ++ R\$X=11M V83 ++ 21=MAR=78 13148154 OFFI (288,288) XFER, FTN1584 ++ R\$X=11M V83 ++ 21=MAR=78 13148154 OFFI (288,288) XFER, FTN1584

```
LOGICAL+1 KYRADL, KYGODL
       DIMENSION IEQUIV(74)
       DIMENSION NAME (4), LSYS(2), THEAD(30), LDEL (20), LSDEL (6)
       DIMENSION ISYS(4), INDLST(4), ISPK(2), ILISTN(4),
       ICOL1(29), ICOL2(29)
       EQUIVALENCE (IRECHO, IEQUIV(1)). (IPGNO, IEQUIV(2)).
       (ISYS(1), IEQUIV(3)), (IMDLST(1). IFQUIV(7)),
       (ISPK(1).IEQUIV(11)).(ILISTN(1).IEQUIV(13)).
       (ICOL1(1), IEOUIV(17)), (ICOL2(1), IEOUIV(40))
       DATA MASK/#377/,#188/#188/
       DATA IGNORE, ISTART, ISTOP, IDROP, IFNDEL
       /#188888."188491,"188892."188883."188819/
       DATA NAME(1), NAME(2), NAME(3), NAME(4)/2HZ., F, B, B/
       CALL ASSIGN(3. 'DF1')
       CALL ASSIGN(4, 'DFI')
       CALL ASSIGN(5, 'TIE')
       CALL ASSIGN(6, 'TI:')
       KEYBADOR
       IOLID ..
       ICSP##
       IOSID1 = 9
       IUS102##
       00 181 Ke1.6
101
       LSDEL(K) 48
       00 188 Ke1,28
       LDEL(K) ##
       WRITE(6,190)
       FURMAT(/1X./
190
    X1X, TENTER SYSTEM ID ... 141)
       READ(5, 191) L8YS(1), L8YS(2)
191
       FORMAT (A2, A2)
       NAHE (2) - LSY8 (2)
       DECODE (4.1990, LSYS) ISYSID
1998
       FORMAT(14)
       CALL ASSIGN(S, NAME)
       READ(3) NL, NS. (IMEAD(K), K=1,3F)
       WRITE(8, 1994) (THEAD(K), K+1.39)
1004
       FORMAT (/1X,30A2/)
       WRITE(6, 192)
       FORMAT (/1x, +HOW MANY LISTENERS TO DELETE? .. 121)
192
       READ(5, 193) NOEL
193
       FORMAT(12)
        WRITE(6,179)
179
        PORMAT(/1x, 1HOW MANY SPEAKERS TO DELETET., 121)
        READ(5.193) NSDEL
        IF (NDEL.LE.A) GO TO 3A9
        DO 388 KHI, NOEL
        WRITE(6,194)
        FORMAT (/1x, TENTER LISTENER ID TO DELETE, . 141)
194
        READ(5,195)LDEL(K)
195
        FORMAT(14)
368
        CONTINUE
        CONTINUE
389
        IF (NSDEL'LE, A) GO TO 31A
        DD 3#91 K+1, NSDEL
        WRITE(6,198)
        FORMAT (/1x, 'ENTER SPEAKER TO DELETE. .. A21)
198
        READ(5,199)LBDEL(K)
```

The second of the second secon

C

C

FORMAT (A2)

```
3891
                   CONTINUE
           310
                   CONTINUE
                   WRITE(6,196)
                   FORMAT (/1x, 'ENTER ANY INCORRECT-CORRECTED KEY PAIR (@ IF OK) 1)
           196
                   READ(5,197)KYRAD,KYBADL,KYGOOD.KYGODL
== FORMAT(13, A1, 13, A1)
                   NL-NL-HDEL
                   NS#NS-NSDEL
          C
                   IF(ICSP.EQ.1) CALL CSPID(1, ISTART)
                   IDATA-ISYSID AND HASK
                   IF(ICBP.EQ.1) CALL CSPIC(1, IDATA)
                   IDATA=ISHFT(ISYSID.=8)
                   IF(ICSP.EQ.1) GALL CSPIO(1, TOATA)
                   IDATABNE, AND . MASK
                   IF(ICSP.EG.1) CALL CSPIC(1, IDATA)
                   IDATA=ISHFT(NL,-2)
                   IF(ICSP, EQ. 1) CALL CSPIO(1, IDATA)
                   IDATAONS AND MASK
IF(ICSP.EQ.1)CALL (SPIO(1,IDATA)
                   IDATABISHFT (NS. -R)
                   IF (ICSP.EQ.1) CALL CSPIN(1, IDATA)
                   DO 88 K+1,38
                   IDATABISHFT (IMEAD (K), =8)
                   IF (ICSP.EQ.1) CALL CSPIC(1.IDATA)
                   IDATABIMEAD(K).AND.MASK
                   IF (ICSP.EQ.1) CALL CSPIC(1, IDATA)
           8
                   CONTINUE
                   IF(ICSP_EQ.1)CALL CSPIO(1,ISTOP)
IF(ICSP_EQ.8)MRITE(4,8888)ISYSID,NL,NS,(IMEAD(K),K=1,38)
           ....
                   FORMAT(14,13,13,38A2)
          C
           1
                   CONTINUE
                   READ (3, END=999) (IEQUIV(K), K=1,74)
                   IF(IPGNO.NE.1)GO TO 2
                   ITLIN=1988+IL18TH(1)+188+IL18TH(2)+18+IL18TH(3)+IL18TH(4)
                   IIDATA-ISHFT(((IEQUIV(12),AND,MASK)+M1FF),8)+
                X((IEQUIV(11) AND MASK)+M188)
                   IF (NSCEL'LE, #) GO TO 189
                   DD 1891 KU1, NSDEL
                   IFITIDATA, EQ. LSDFL(K))GO TO 1
           1891
                   CONTINUE
                   CONTINUE
           189
                   IF(NOEL.LE.W)GO TO 119
                   DO 11 KO1, NOFL
                   IF (ITLID EQ.LUEL(K))GO TO 1
           11
                   CONTINUE
           110
                   CONTINUE
                   IF (ITLID' NE. IOLID) GO TO 31
           21
                   CONTINUE
                   GO TO 32
                   CONTINUE
           25
           2
                   CONTINUE
                   IP(NSDEL.LE, M) GO TO 211
                   00 2118 KA1, NSPEL
                   IF (IIDATA, EQ.LSDEL (K)) GO TO 1
           2110
                   CONTINUE
                   CONTINUE
           211
                   IF (NOEL, LE, 4) 50 TO 210
                   DO 12 KE1, NOEL
                   IF (1TL 10.E4.LDEL (K))GO TO 1
                   CUNTINUE
            12
            219
                   CONTINUE
```

```
IF (108P, ER, 1) CALL CSPID(1, ISTART)
         00-3 KE17.74
         TDATABLEQUIVIK), AND, MASK
         IF (ICSP. EQ. 1) CALL CSPIN(1, INATA)
         IDATABISHFT (JEDUTY (K) . - A)
         IF (ICSP. F9. 1) CALL CSPIN(1. IDATA)
         CONTINUE
         IF (ICSP.ER. () CALL ESPIN (), 1510P)
         JF (ICSP. FIJ. WINRITE (4, BOWI) (IFOUIV(F), KE17, 74)
         FURMAT (5811)
         GP TO 1
C
 31
         CONTINUE
         IF (ICSP.FR. 1) CALL CSPIN(1. ISTARY)
         IDATA = ) TL TO, AND, MASK
         IFFICSP.EU. ISCALL CSPIC(1, IDATA)
         IDATA=ISHFT(ITLID,=H)
         IF (103P, EQ. 1) CALL CSPIN(), TOATA)
         IF (ICSP, FG. 1) CALL CSPIC(1, ISTOP)
         IF (ICSP. FO. W) WHITE (4, BAU2) TTL ID
 8882
         FORMAT(I4)
         IOLID#JTLID
         GO TO 21
¢
 32
         CUNTINUE
         IF (ICSP.EO.1) CALL CSPIN(1, 1START)
         TDATAR(TEGUTY(12) AND MASKY+MINN
IF(ICSP.EG.1)CALL CSPIC(1, TDATA)
         IDATA (TEGUTY(11) AND MASKY MING
IF (ICSP. FO. 1) CALL CSPID(1, 10 ATA)
         TIDATA = ISHFT (((IFUUIV(12).AND. MASK)+M) PV), R)+
     X((IEQUIV(11) AND MASK) +H1 AR)
         IKEYN#1WA+IEOUIV(7)+1H+IEGHIV(A)+1EGHIV(9)
         IF (IKEYN.EQ.KYHAD) KEYHADES
         IF (IKEYN', EQ. KYRAD) IKEYN#KYGODO
         IDATABIKEYN, AND, MASK
         IF (ICSP, EG. 1) CALL CSPIN(1, IDATA)
         IDATARISHFT (TKEYN, -8)
         IF (ICSP.FQ. 1) CALL CSPIN(1, TOATA)
         IDATA# (IEQUIV(10) . AND . MASK) + M109
         IKEYL#ISHFT(((IEDUIV(10),AND,MASK)+MIGG),+F)+
      X((IEGUIV(10).AND.MASK)+M100)
         IF (KEYRAD, EQ. 1) IMEYLEKYGODE
         KEYBADES
         IF(ICSP.EQ.1)CALL CSPIC(1, TOATA)
         IF (ICSP, EU, 1) CALL CSPIC(1, 1DATA)
         IF (ICSP.EQ. 1) CALL CSPIN (1, 1STOP)
C
C
         IF (ICSP.EQ.A) HRITE (4, 8A) A) TIDATA, IXEYN, IKEYL, IKEYL
 BRIR
         FURMAT (A2, 13, A1, A1)
         105101=13PK(1)
         105102=15PK(2)
         GD TO 22
C
 999
         CONTINUE
         IF (ICSP.EQ. 1) CALL CSPIN(1, TENNEL)
         IF (ICSP.EQ. 1) CALL CSPIN(1, TENNEL)
         IF (ICSP. EQ. RIENOFILE 4
         IF (ICSP.EQ. A) ENDFILE 4
         STOP
```

<u>, i</u>

≟:

END

```
++ RSx-11H VP3 ++ 21-MAR-7R 13:49:29 DF0:12P0:20013CORE.FTN;7
++ RSx-11H VR3 ++ 21-MAR-7R 13:49:29 DF0:1200:20013CORE.FTN;7
++ RSx-11H VR3 ++ 21-MAR-7R 13:49:29 DF0:1200:20013CORE.FTN;7
```

```
$$55555
                 CCCCCCCC
                                nonnnn
                                            ******
                                                          EEFFEEEFEE
                                            RPRRPRR
                                                          EFERFEEEEE
   5555555
                 CCCCCCCC
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               CC
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                                            RP
                                                    HR
                                                          F.F
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                             00
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                                                          F.E
               CC
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         $5
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                                                    RR
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                                                          FREEFEFEE
$555555
                 ccccccc
                                                                             ....
```

FFFFFFFFF	*********	NN	NN	1111	7777777
FFFFFFFF	TTTTTTTTT	NM	NN	1111	7777777
FF	TT	HN	NN	7117	77
FF	TT	NN	NN	1111	77
FF	TT	NNNN	NN		77
FF	TT	NNNN	NN		77
FFFFFFF	TT	NN NN	NN	1111	77
FFFFFFF	TT	NN NN	NN	1111	77
FF	TT	NN F	INNN	;;;;	77
FF	TT	NN A	INNN	3137	77
FF	TT	NN	MN	11	77
FF	TT	NN	NN	11	77
FF	TT	NN	NN	11	77
FF	TT	PIN	NN	11	77

```
++ R$X=11F VR3 ++ 21=MAR=7R 13:49:29 DFR:[200,200] SCORF.FTN:7
++ R$X=11M VR3 ++ 21=MAR=7R 13:49:29 DFR:[200,200] SCORF.FTN:7
++ R$X=11M VR3 ++ 21=MAR=7R 13:49:29 DFR:[200,200] SCORF.FTN:7
```

```
COMMON/A/IDSYS, TSYS (50), NAME (15), NPAGE (7,2,3),
      * MSPK(15,9), MKFY, LETTER, LIST, TSPK, NUML, NIMS, ARRAY(6A), TRESP(2,29),
      XDATA(12,6,34)
C
         CALL ASSIGN(A, IDENINEWREY, KEYI)
CALL ASSIGN(4, IDENII)
         TCOMEN
 1
         CONTINUE
         CALL CTL/[COM]
         CALL SCORF (TOUM)
         TECTOOM. FR. WICALL MATH
         GO IN 1
         FND
         SUBROUTINE CTL/ICOM)
C
C
C
C
        DIAGNOSTIC HHYPE TEST SCORING PROGRAM
C
C
C
¢
                                                     3 DEC 76
C
C
        STEVEN MEISTER, ESD/MCEL, HANSCOH AFR, MA 01731
C
C
C
        NUMBER & NUMBER OF SUBFRATURES CORRECT EACH LISTENER
        NUME & NUMBER OF MAIN FEATURES CORRECT EACH LISTENER
C.
        NUML = NUMBER DE LISTENERS
C
        NUMS & NUMBER OF SPEAKERS
        LIST = CURRENT LISTENER
        ISPKR & CURRENT SPEAKER
        TKEY = CHRPENT KEY NUMBER
C
        NKEY = CHRRENT KEY INDEX NUMBER FOR KEY ARRAY
        TPAGE # PAGE HETNG SCORED
        IFFAT a THUEY FOR MAIN FEATURES
C
                          1 * VOICTNG
¢
                          P = NASALITY
C
                          3 # SUSTENTION
C
                          4 = SIBILATION
Ĉ
                          5 # GRAVENESS
                          A = COMPACTNESS
C
                          7 a EXPERIMENTAL
C
        FRATURE ARRAY FEY:
r,
                          PRESENT ABSENT
C
C
                                               L . LISTENER NUMBER
        MAIN FEATURE
                          (L,1,1) (L,2,1)
C
        SUR FEAT PRES
                          (L,1,2) (L,2,2)
C
        SUR FEAT ARS
                          (L.1.3) (L.2.3)
0000
        FEAT(19,N,M) # MEAN FOR N,M
        FEAT(20,N,H) = STANDARD FREDR FOR N,H
        FEAT(18,1,M) = MEAN FOR PRESENT + ABSENT STATE OF M
Ċ
        FEAT(18,2,M) # S.E. FOR PRESENT + ABSENT STATE OF M
```

Î

C

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```
C
          PAGE(I,J,K) AND .NPAGE(I,J,K):
 C
                            I . FEATURE
 C
                            J = 11PRESENT 21ARSENT
 C
                            K = 11MATH PISUR PRES 318UB ARS
 C
 C
 C
          DIMENSION KEY (58) , KEYSUB (58, 2)
         DIMENSION NEWKEY (58,64)
C
C
         COMMON/A/IDSYS, ISYSTF (50), NAME (15).
         NPAGE(7,2,3), MSPK(15,0), MKEY, LETTER,
LIST, ISPK, NUML, NUMS, ARRAY(6H), IRESP(2,29), DATA(12,6,36)
          INTEGER ANSHER
0000
C
         DATA IALPHA, IALPHB/2HAA, 2HBB/
C
         SUR FEATURES KEY
         DATA KEYSUR/0,8,1,8,1,0,3+1,3+8,1,1,5+8,1,8,1,1,4+0,1,3+0,3+1,
         3-0,1,0,1,0,1,3-0,7-1,0,1,4-0,1,1,0,1,0,1,3-0,1,0,1,3-0,1,1,
         9,1,8,1,1,8,4+1,3+8,1,3+8,3+1,8,3+1,8,3+1,8,1,5+8,1,8,4+1/
C
         READI SYSTEM, NUMBER LISTENERS, NUMBER SPEAKERS
C
         IF (ICOM. NE. 0)GO TO 1040
         LISTER
         CALL ASSIGN(6, 'DFG: 1)
C
         READ (3) NEWKEY
         READ (4, 193) IDSYS, NUML, NUMS, (ISYSTE(I), T=1, 39)
 103
         FORMAT (14, 13, 13, 38A2)
 1888
         CONTINUE
         IF ((LIST+1), GT, NUML) GO TO 200
     LISTALIST+1
         ISPKER
C
         READ LISTENER ID
C
        READ (4, 194) NAME (1 IST)
 194
        FORMAT(I4)
 1848
         CONTINUE
         IF ((ISPK+1) . GT. NUMS) GO TO 1980
         ISPK#ISPK+1
        DO 61# Is1,7
        DU 618 Ja1,2
        DU 618 K#1,3
 618
        NPAGE(I,J,K) # P
C
C
        READ SPEAKER NAME, KEY NUMBER AND LETTER
C
        READ (4, 1939) MSPK (LIST, ISPK), NKFY, LFTTER
 1838
        FORMAT(AP, T3, AP)
        MKEY . NKEY
        20 881 KK=182,188
         IF (NKEY.NE.KK) GO TO HA!
        NKFY#2+(KK-192)+1
        GO TO 150
 821
        CONTINUE
```

They was all the day to a con-

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```
887
         IF (NKEY.NE.111) GO TO HOR
         NKEY#15
         GO TO 150
IF (NKEY.NE.112)GO TO HØ9
 808
         NKEY#17
         GU TO 159
 800
         IF (NKEY.NE.113) GO TO A1H
         NKEY=19
         GO TO 150
 818
         IF (NKEY.NE. 115) GO TO 811
         NKEY=21
         60 TO 150
         IF (NKEY.NE. 1161GD TO 812
 811
         NKFY#23
         GO TO 150
 812
         IF(NKEY,GT,318)G0 TO 151
         IF (NKEY LE . 304) GO TO 151
         NKEY=25+2+(NKEY-301)
         GO TO 15#
 150
         IF (LETTER NE . IALPHR) GU TO 1501
         NKEYENKEY+1
         GO TO 152
 1501
         TE (LETTER . FO . TALPHA) GO TO 152
 151
         WRITE (5, 340) NKEY, LETTER
         FORMAT(///! ***** NO KEY 1,13,41,1 ******///)
 300
         STOP
         CONTINUE
 152
C
C
Ċ
         DO 1527 K#1,58
 1527
         KEY (K) = NFWKEY (K, NKFY)
C
C
C
        DU 114 IPAGE # 1,4
¢
C
        READ CURRENT PAGE
C
        READ(4,107)((IRESP(ICOL,THOW),IROH=1,29),ICOL=1,2)
 196
C
C
C
C
Ç
C
 197
        FORMAT (5811)
        DU 293 ICOL #1.2
        NO 284 IROW #2,29
        ESTABLISH FEATURE REING SCORED
C
         IF (IROW. LE.A) IFEAT#IROW#1
        ITEMP SINOWAS
         IFEAT#HOD (ITFMP,7)
         IF (IFEAT EQ. 0) IFFAT#7
        ESTABLISH WHICH COLUMN PRESENT STATE OF FEATURE IS IN.
C
         IPRES=1
        IF (IPAGE.LE. 2) IPPES=0
        FIND KEY ELEMENT
C
        KEYELETRIN
        IFIICOL.EG.21KFYFL=IHOW+29
         INDEX # 2
        IF (IPAGE, EQ. 1) GOTU 29H
        IF (IPAGE ED. 3) GOTO 298
```

CARLES CHARACTER CONTRACTOR

```
IF (KEY (KEYFL) . NE. IPRES) INDEX . 1
         GOTU 299
         IF (KFY/KEYEL) .EQ. IPRES) INDEX#1
 298
         INDEX #1 IMPLIES MAIN FEATURE PRESENT! 2 IMPLIES ABSENT.
C
         SCORE THE HESPONSE
C
 299
         ANSHER . F
         IF (IPAGE EQ.1) GOTO 295
         IF (IPAGE'ER.3) GOTO 295
         IF (KEY(KEYEL) . NE . IRESP(TCOL , IROW) ) ANSHER = 1
         GUTU 295
 295
         IF (KEY (KEYEL) _ EQ. IRESP (ICOL , TROWS) ANSWER #1
         CONTINUE
 206
         IF (IFEAT, EQ. 7) GUTO 257
         ISUBP = 2
         NSHBP#2
         IF (IPAGE .EQ. 1) ISUHP#1
         IF CIPAGE . EQ. 33 ISHAP#1
         IF (KEYSUR (KEYEL, ISHHP) LEG. A) NSHBP#3
         GOTO(251,252,253,254,255,2561,1FEAT
         NPAGE (1, THOFY, 1) ENPAGE (1, THOFX, 1) + ANSHER
 251
         NPAGE(1, INDEX, NSURP) #NPAGE(1, INDEX, NSURP) + ANSWER
         GOTU 264
         NPAGE (2, INDEX, 1) ENPAGE (2, INDEX, 1) + ANSWER
 252
         NPAGE (2, INDEX, NSURP) ENPAGE (2, INDEX, NSURP) + ANSWER
         6010 250
 253
         NPAGE(3, INDEX, 1) #NPAGE(3, INDEX, 1) +A'-SHER
         NPAGE (3, TNDEY, NSURP) #NPAGE (3, INDEX, NGURP) #ANSWER
         GDT0 262
         NPAGE(4, INDEX, 1) = NPAGE(4, INDEX, 1) + ANSWER
         NPAGE (4, TNDEX, NSUMP) ENPAGE (4. INDEX, NSUMP) + ANSWER
         GOTO 252
         NMAGE(4, INDEX, 1) #NPAGE(5, INDEX, 1) + ANSWER
 255
         NPAGE (5, INDEX, MSHBP) #NPAGE (5, INDEX, MSHBP) +ANSWER
         GUTO 253
         NEAGE(S, INDEX, 1) ENPAGE (O, INDEX, 1) + ANSWER
 256
         NPAGE (A, INDEX, NSURP) & NPAGE (B. INDEX, NSURP) + ANSWER
         GOTU 253
         NPAGE(7, INDEX, 1) #NPAGE(7, INDEX, 1) + ANSWER
 257
 264
         CONTINUE
 224
         CONTINUE
         CONTINUE
 213
r
C
C,
         CUNTINUE
119
C
         ICOM#1
         RETURN
C
 201
         CONTINUE
         CONTINUE
 202
         ILDM#?
         RETURN
         Fun
          SURWINITINE SCHRETTIPLACES
```

```
C
 C
          COMMON/A/IDSYS, ISYS(59), NAME(15), NPAGE(7,2,3),
       1 MSPK (15, 9) . MKEY, LETTER, LIST, ISPK, NIML, NUMS, ARRAY (64), IRESP(2,29).
       CAE, 8, SI) ATACK
          DIMENSION SENDING, TEMPIZ. 91
         IF (NPLACE, NE', 1) GOTO P
FORMAT (1 SYSTEM TESTED: 1, 14, 3x, 30AP//5x, 1NUMBER LISTENERS #1, 13/
          5x, 'NUMBER SPEAKERS =1, T3//1
  574
          FORMAT (1H1)
  5888
          CONTINUE
          DD 28 1=1,6
          DO 22 K=1,3
          DO 41 Jat. 2
          L = 6+1+3+2+K-8
          NTOT # 16
          IF (K.NE. 1) NTOTER
C
C
C
¢
 61
          TOT # FLOAT (NTOT)
          DATA(LIST, TSPK, L) = (2, M+FL OAT(NPAGE(I, J, K)) +TOT) +100,/TOT
          NPAGE(I,J,K) = "ITHT-NPAGE(T,J,K)
 41
          CONTINUE
 22
          CONTINUE
 20
          CONTINUE
          IF ((ISW.AND.1).ED.#)RETURN
n
          WHITE (R, 276)
ŋ
          WRITE(5,277) (NPAGE(1,J,11,J=1,2)
ŋ
          WRITE(K, 278) (NPAGE(1, J, 21, 1=1, 2)
         WRITE(4,279) (NPAGE(1,J,3),J=1,2)
7
ŋ
         WHITE (6,280) ( VPAGE (2, J. 1), Ja1,2)
          WRITE (6,291) (NPAGE (2, J. 2), J#1,2)
4
n
         WHITE (6, 282) (NPAGE (2, J.3), J=1,2)
         WEITF (6, 283) (MPAGE (3, J, 1), J=1,2)
n
         WHITE (5, 284) (NEAGE (3, 3, 2), J=1, 2)
7
         WHITE (6, 285) ("PAGE (3, J. 3), J#1, 2)
ר
         WEITE (4, 286) (NPAGE (4, J. 11, JE1, 2)
n
13
         WMITE (5, 284) (NPAGE (4, J.2), J#1,2)
9
         WRITE (6,245) (NPAGE (4,3,3), J=1,2)
n
         WW [TE(8, 287) (NEAG) (5, 1, 1), 1=1,21
         WHITE (8, 284) (NPAGE (5, 3, 21, 3=1, 2)
n
         WRITE(5,285) ("PAGE(5,3,31,31,3=1,2)
.
         WETTERS, 288) ("POGE (6, J. 1), (181, 2)
0
Э
         WESTE (6,284) (PAGE (6,3,2), J=1,2)
η
         WETTE (6, 285) CUPAGE (6, J. 31, J=1, 2)
021
         FORMAT(10X, 15, 5Y, T5)
13
         RETURN
2
         CONTINUE
         DO SHA LISTAL, HUML
         WRITE (5,500)
         WRITE(6,1) IDSYS, (ISYS(I), Im1,30), NUML, HUHS
         WHITE (M, 201) NAME (LIST)
241
         FORMAT(13x,7/1+1)/1 FOR LISTENERS 1, T4, 1 +1/
         13X,7(1+11//
         1 SPKH SCORE!/)
         DO 204 ISPKR#1, NUMS
         SUM = 7.7
```

```
DO 202 I=1.31.6
        J=1+1
        SUM = SUM + DATA (LIST, JSPKR, T) + DATA (LIST, ISPKR, J)
222
        SUH = SUM/12.4
        wRITE (6, 203) MSPK (I TST, TSPKR) . SUM
        FORMAT(1x, 42, 1x, 57, 2)
293
204
        CONTINUE
        WRITE (5, 403)
        WEITE (6,494)
        DO 289 1:1,5
        SEND(1) =#.P
279
        DO 214 1#1,35,21
        J=1+1
        DO 211 K#1.NUMS
        ARRAY (K) BOATA (L TST, K, I)
211
        CALL STATS (NIMS, X, S)
        SFND(1)=X
        SEND (21=5
       DI 212 KE1, NIMS
APRAY(K) #DATA(LIST, K, J)
212
        CALL STATS (NUMS, X, S)
        SEND(3) # Y
        SEND (41 . S
        DU 213 RE1. NUMS
        ARRAY (K) = (ARRAY (F) + DATA (LIST. K. I)) /2.0
213
        CALL STATS (NIMS, X, S)
        SEND(5) #X
        SEND (A) ES
        CALL DISTIT, SEND)
        CONTINUE
210
        DO 215 KE1, NUSS
        SIIM # 24.0
        DO 214 I=1,31,6
        SUM = SUM + DATA(LIST, K.T)
ARRAY(K) = SUM/F.O
214
215
        CALL STATS (NUMS, Y, 4)
        SEND(1) #Y
        SFND (2) #5
        DO 216 Kal, NUMS
        SUM # M.M
        DO 217 1=2,32,6
        SUM # SUM + DATAFLIST, F, T)
217
        ARRAY(K) = SUM/6.4
216
        CALL STATS (NIMS, X, S)
        SEND (3) = X
        SEND(4) = S
        00 219 Kat, NIMS
        SUM # 0.0
        DO 218 I=1.31,6
        J * 1+1
        SUM # SUM + DATA(LTST, K, I) + DATA(LTST, K, J)
218
        ARRAY(K) # SIM/17.4
219
        CALL STATS (NIMS, X, S)
        SEND(5) # X
        SEND(6) . S
        CALL DUT(36, SEND)
        WRITF (8, 498) Y.S
202
        CONTINUE
        DO BOW ISPKR # 1, NIMS
        WRITE(6,500)
        WHITE (R. 1) IDSYS, (TSYS(T), I#1, 3M), NUML, NUMS
        WRITE(5,301) MSPK(1,1SPKH)
        FURMAT(19x, 1+++++1/1 FOR SPEAKERS 1, A2, 1 +1/
3#1
```

```
12x, 1+++++1//1 LISTENER1.4x, 1 SCORF1/)
       DO 384 LIST . 1. NUML
       SUM . A.P
       DO 302 101,31,6
        J=1+1
       SUM & SUM+DATA(LIST, ISPKR, I)+DATA(LIST, ISPKR, J)
302
        SUM # 5114/12.4
        WRITE (6, 303) NAME (LIST), SUM
        FORHAT(14,14,6x,F7.2)
303
394
       CONTINUE
        WRITE (6,403)
        WRITE(6, 494)
       DO 310 I=1,35,2
        J#1+1
        00 311 K=1.NIIHL
        ARRAY (K) =DATA (K, ISPKR, I)
311
        CALL STATS (NUML, Y, S)
        SEND (1) = X
        SEND (2) = 5
        DO 312 Kal. NIML
        ARRAY (K) WDATA (K, ISPKR, J)
312
        CALL STATS (NUML, Y, S)
        55ND (3) = X
        $END (41 #8
        09 313 Ket, NUML
        ARRAY(K) = (ARRAY(K)+DATA(K, ISPKR, I))/2.0
313
        CALL STATS (NIMI., X, S)
SEND(5) = X
        SEND (6) = 5
        CALL DUT(I.SEND)
        CONTINUE
310
        DO 315 KEI, NIML
        SUM . R.P
        00 314 1=1.31.6
        SUM . SHH + DATA(K, ISPKR, I)
314
        ARRAY(K) = SUM/6.2
315
        CALL STATS (NIML, Y, S)
        SEND (1) #X
        SEND (2) = 8
        no 316 Kal, NUML
        SUM . R.P
        DO 317 I=2,32,6
317
        SHM = SHM+DATA(K, ISPKR, 1)
        ARRAY(K) =SUM/6.R
316
        CALL STATS (NUML, X, S)
        $ + NO (3) = X
        SEND (4) = 8
        DO 319 KB1, NUML
        SIIM EN.A
        00 318 [=1,31,6
        J=1+1
        SUM . SUM+DATA(K, ISPKR, I)+DATA(K, ISPKR, J)
318
        ARRAY(K)=SUM/12.0
319
        CALL STATS (NIML, X, 5)
        SEND (5) #X
        SEND (5) #5
        CALL OUT (3A, SEND)
        WRITE (8,498) X,8
        TEMP(1, ISPKR) #X
         T+ HP (2.18PKR) =8
300
        CONTINUE
         WRITE(8,500)
         WRITE(8,1) IDSYS, (ISYS(I), I=1.3P), NUML, NUMS
```

```
WKTTF(6,320)
320
        FORMAT ( ! COMMINED RESULTS - STANDARD ERRORS ACROSS 1.
        ISPEAKERS AND ITSTENERS ******//)
        WKITF (6, 403)
        WRITE (F, 494)
        NUMT . NUML . NUMS
        00 321 101,35,2
        J=I+1
        DU 322 KalaNIML
        DO 322 L #1, NUMS
        MUNUMS+ (X-1)+L
        AFRAY(M) =DATA(K,1,1)
322
        CALL STATS(NIPT, X, S)
        SEND(1)=X
        SEND (2) #5
        00 323 K#1, NUML
        DI 323 LE1, NIMS
        M=NUMS+(K-1)+L
        ARRAY(M) =DATA(K,L,J)
323
        CALL STATS (NUMT, X, S)
        SEND (3) #X
        SEND (4) = 5
        DO 324 KE1, NUML
        DO 324 L=1. NIMS
        MENUMS+(K-1)+L
        SUM = DATA(K,L,T)+DATA(K,L,J)
324
        ARRAY (M) =SIIM/2.0
        CALL STATS (NUMT, X, S)
        SEND (5) =X
        5END (6) #5
        CALL OUT(I, SEND)
221
        CONTINUE
       00 325 Km1, NIME
00 325 Lm1, NUMS
        M#NUMS+(K-1)+L
        SUM # 7.0
        DO 326 1m1;31,6
        SUM # SUM+DATACK, L, 1)
326
        ARRAY (M) =SUM/6.4
325
        CALL STATS (NIMT, X, S)
        SEND(1)=X
        SEND (2) ...
        00 327 Kal, NIML
        DO 327 L=1.NIMS
       MeNUMS+(K-1)+L
        SUM=0.0
       DO 328 I=2,32,6
328
        SUM - SUM + DATACK, L, IT
327
        ARRAY(M) =SUM/6.4
       CALL STATS (NUMT, X, S)
       SEND (3) =Y
        SEND (4) = 5
       DD 339 Kal, NIML
       DC 338 LELANIMS
       MENUMS+ (K+1)+L
       SUM . P.
       DD 331 1=1,31,6
        J=1+1
       SUM . SUM+DATA(K,L,I)+DATA(K,L,J)
331
       ARRAY (M) #SUM/12.0
330
       CALL STATS (NIMT, X, S)
       SEND(5) #X
       SEND (4) #8
```

```
CALL OUT (36, SEND)
         WRITE (R, 49F) X, 5
         WRITE(6,501) (MSPK(1,J),J#1,NUMS)
         WRITE (6,592) (TEMP(1,K),K=1,NUMS)
         WRITE(8,503) (TEMP(2,K),Ke1,NIMS)
         FURMAT (//QX, Q (A2, 5X))
 5m1
 582
         FORMAT(/ | MEAN 1,9124, F5.21)
 583
         FORMAT(/1 8.F. 1,9(2x,F5.21)
         NPLACEER
         RETURN
 276-
         FORMAT(10X, 'HAIN ATTP: ', 'RY, 'PRES', 7X, 'ARS'//)
 277
         FORMAT(15x, 'VOIC', 23x, 12, 11x, 12)
         FORMAT(20x, 'FRIC', 16x, 12, 11x, 12)
 278
         FORMAT (20x, INUN-FRICI, 12x, 12.11x, 12/)
 279
         FURMAT(15x, !NASA) 1,22x, 12,11x, 12)
 280
         FORMAT (20x, 1GRAVE 1, 21x, 12, 11x, 12)
 281
 282
         FURMAT (20X, 'ACUTE', 21X, 12, 11X, 12/)
 283
         FURMAT(15x, 15USTEN1, 20x, 12, 11x, 12)
 284
         FURMAT (20X, IVUIGED 1, 20X, 12, 11X, 12)
 285
         FURMAT (20x, 'UNVOICED', 1HY, 12, 11X, 12/)
 286
         FURMAT(15x, 'STBIL', 20x, 12, 11x, 12)
         FURMAT(15x, 'GRAVENESS', 21x, 12, 11x, 12)
 287
         FORMAT (15%, 100MPACTNESS1, 19%, 12, 11%, 12)
 288
 488
         FORMATE DRT MEANS AND STANDARD FRRORS FORT, 13,1 LISTENFRS!/)
         FORMAT ( SYSTEM UNDER TEST: 1.5841/)
 491
         FORMAT(! NUMBER OF SPEAKERS =1,12/)
 492
 423
         FORMAT(//! MAIN ATTHINTFIT, 12X, PRESENTT, 19X, TARSENTT,
         12X, TOTAL 1/)
 494
         FORMAT (24x, 3/4x, 1MFAN
                                     S.E. 11/1
 498
         FURMAT(/30X, !+++++++++++!/
         344, 10 MFAN = 1, FR. 2, 1 +1/
         13Y, ITOTAL OPT SCORE: +1.15Y. 1+1/
         3PY, 1+ S.E. = 1,FR.2,1 +1/
        39x, 1 **********
         END
Ç
C
C
C
         SURROUTINE STATS(N, XMEAN, STOFPR)
C
C
        COMMON/A/IDSYS, ISYS (501, MAME (15), NPAGE (7,2,3),
     XMSPK(15,9), MKEY, LETTER, LIST, TSPK, NUML, NUMS, ARRAY(60), IRESP(2,29),
     XDATA(12,6,36)
        X=F.F
        YN . FLUAT(N)
        00 1 I=1,N
        X . X + ARRAY(I)
        CONTINUE
 1
        AHENN # X\XN
        STOERR . A.A
        DO 2 1=1.N
        STHERR # STHERR + (ARRAY(I) - YMEAN) + (ARRAY(I) - YMEAN)
 2
        STHERM = SORT (STHERR/XN/XN)
        RETURN
        END
        SUBMOUTINE OUT (N, X)
        DIMENSION Y(6)
        IF (N.EQ.34) GOTO 19
        K=(N+1)/2
```

```
IF (K.EQ. 11)KEH
         TF(K.ED.14)K=8
         IF (K.EQ. 17) K#8
         IF (K.EQ. 12) K#9
         IF (K.En. 15) Ka9
         IF (K.EQ. 18)K=9
         IF (K.EQ. 13) K#11
         TF(K.ED.16)K=12
        GOTO(1,2,3,4,5,6,7,8,9,10,13,16),K
         WRITE(6,405)(X(1),1=1,6)
1
        RETURN
2
        WRITE(5,446)(X(1),1=1,6)
        RETURN
3
        WRITE(6,407)(X(1),1=1,6)
        RETURN
        WRITE(6,408)(X(I),I=1,6)
        RETURN
5
        WRITE(6,4P9)(X(1),1=1,6)
        RETURN
6
        WPITE(6,410)(X(I),I=1,6)
        RETURN
        WRITE(6,411)(X(I),I=1,6)
        RETURN
8
        WKITE(6,412)(X(I),I=1,6)
        RETURN
        WRITE(6,413)(X(I),I=1,6)
9
        RETURN
10
        WRITE(6,414)(X(1),181,6)
        RETURN
13
        WRITE(6,415)(X(1).1=1.6)
        RETURN
16
        WRITF(6,416)(X(I),I=1,6)
        RETURN
19.
        WRITE(6,417)(X(I),I=1,6)
        RETURN
        FURMAT (3x, 'VOICING', 9x, 3 (3x, F6, 2, 2x, F6, 2))
465
        FURHAT(6x, 'FRICTIONAL', 4x, 3(3x, FR, 2, 2x, F6, 2))
426
        FORMAT (64, 'NO 4-FRICTIONAL 1,3(34, F6.2,24, F6.2)/)
497
       FURMAT (3x, !NASALITY!, Ax, 3 (3x, F6, 2, 2x, F6, 2))
FURMAT (6x, !GRAVE!, 9x, 3 (3x, F6, 2, 2x, F6, 2))
498
440
414
        FORMAT(6x, !ACUTE!, 9x, 3(3x, F6. 2, 2x, F6. 2)/)
411
        FORMAT(3x, 'SHSTENTION', 6x, 3 (3x, F6, 2, 2x, F6, 2))
412
        FORMAT (6x, 1V01CED1, 8x, 3 (3x, F6, 2, 2x, F6, 2))
        FORMAT (6x, 'UNVOICED', 6x, 3 (3x, FR, 2, 2x, FR, 2)/)
413
        FURMAT (3x, 'STRILATION', 6x, 3 (3x, F6, 2, 2x, F6, 2))
414
        FURMAT (3x, 'GRAVENESS', 7x, 3/3x, F6, 2, 2x, F6, 2)
415
416
        FORMAT (3x, 'COMPACTHESS', 5x, 3 (3x, FH, 2, 2x, FA, 2))
       FURMAT(3x, 'TOTALS', 10x, 3(3x, F6.2, 2x, F6.2))
417
        SUBROUTINE MATE
       CUMMON/A/IDSYS, ISYS (5M), MAMF (15), MPAGF (7, 2, 3),
    XMSPH (15,9), MKEY, LETTER, LIST, ISPK, NUML, NUMS, ARRAY (60), IRESP(2,29),
    XDATA(12,6,36)
       DIMENSION XMATR(15,6), ITALK(9), ANS(2,6)
       DIMENSION DEV(15,6), VAR(15), XLM(15), SM(6), FSTAT(15)
        DIMENSION NHEL (5)
       DATA IBLNK/2H /
       KKKSA
        NUMFER
       DO 200 I=1, NUML
       DO 284 Kai, NUMS
```

C

C

VALUE OF STREET

```
SUMBR.
         00 202 II=1,31,4
         JJ=11+1
 242
         SUM=SUM+DATA(I,K,JI)+DATA(Y,K,JJ)
         SUM=SUM/12.
 200
         YMATR (I,K) #SUM
C
 312
         CONTINUE
         DO SEUS JJET KKK
         DO 203 1=1.9
 293
         ITALK (I) = IBLNK
         DO 204 Im1, NUMS
 294
         ITALK(T) = MSPK(1,T)
C
         WRITE (A, 198)
         WHITE(R, 197) IDSYS, (ISYS(T), I=1.30), NUML, NUMS
         WRITE(6,193)
         WHITE (6, 100) (ITALK (I), I=1, 9)
         IF (NUMS.EU. A) WRITE (A. 1941)
         IF (NUMS, EQ. 3) WRITE (6, 1042)
 1001
         FORMAT (1H+, 49X, 4HMF AN, 4X, 4HS, E.)
         FORMAT (1H+, 2AX, 4HHFAN, 4X, 4HS, E.)
 1882
         WRITE (6, 102)
C
C
        DO 281 LIST=1, NUML
        DO 295 ISPK#1, NUMS
         ARRAY (ISPK) = YMATP (LIST, ISPK)
295
        CALL STATS (NUMS, X, S)
         HRITE(6,101)NAME(LIST), (XMATR(LIST, ISPK), ISPK=1, HHMS), X, S
281
        DO 206 ISPK#1, NUMS
DO 207 LIST#1, NUML
237
         ARRAY(LIST) = XMATR(LIST, ISPK)
        CALL STATS (NUML, X, S)
                                                             THIS PAGE IS BEST QUALITY
         ANS(1, TSPK) =X
         ANS (2, 13PK) #S
276
        CONTINUE
         WRITE(6,144)(ANS(1,1),1=1,NUMS)
        WRITE (8, 105) (ANS(2, 1), (#1, NUMS)
        DO 208 ISPK#1.NUMS
        DO 2P8 LIST#1, NUML
        K=NUMS+(LIST-1)+ISPK
298
         ARRAY (K) = XMATH (LIST, ISPK)
        NUMTENUMSENUML
        CALL STATS (NIMT, X, S)
        WRITE (R. 196) X.S
2992
        CONTINUE
        VHIGOR.
        WRITF(6,108)
        WRITE(6, 197) IDSYS, (ISYS(I), I=1,30), NUML, NUMS
        WHITE (6,30A)
        FORMAT(//2x, LISTENER DEVIATIONS FROM SPEAKER MEANS!//)
3 au
        WRITE(6,193)
        WRITE(6,140) (ITALK(1),1=1,9)
        IF (NUMS.EQ.6) WRITE (6.1003)
        IF (NUMS.EQ. 3) HRITE (6, 1894)
1003
        FORMAT (1H+,51X,3HVAR)
        FORMAT(1H+,30X,3HVAR)
1884
        WRITE(6,102)
        XNUMS . NUMS
        XNUMLENUML
        TOTAL SYNUMS + XNUML
        00 381 J=1, NIMS
```

```
SUMER,
DO 302 Int. MIME
         SUMESUM+XMATR(J,J)
 302
 321
         SM (J) = SUM/XNIIMI
         00 383 Int. NUMI
         SIIMEN.
         DO 304 Jet, NUMS
 374
         SUM = SUM + YMATR(T, J)
         XLM(T)=SUM/KNUMS
 373
         SUMER.
DO 305 Imi, NIME
         SUM=SUM+YLM(1)
 375
         GMESIJM/XNIIML
C
         DIT 305 IES, NITHE
         On 307 Ja1, NUMS
 307
         DEV(I,J) = XMATR(I,J) = SM(J)
         SSEM.
         DO BAR JET, NUMS
         SSmSS+DEV(1,J)+PFV(1,J)
 376
         VAR(I)#SS/XNUMS
         IF (VAH(I) LE . VRIGIGO TO 334
         VHTGEVARITY
         LRIGET
         WRITE (6, 101) NAME (1), (DEV(I, J), J=1, HHMS), VAR(I)
 334
C
         CALL UNTER (XMATH, NUME, NUME, I.F. FSTAT)
C
 306
         CONTINUE
C
         KMPSNUML-NUMS-1
         WRITE (6, 4MM) NUMS, KMP
         FORMATI// F STATISTIC FOR TESTING EACH LISTENER
     X AS AN OUT-LYEN ! / ! COMPARE WITH F PERCENTAGE POINT
     x with DF=1, T3, 1 AND1, 19/1
         WRITE(6,441)
 481
         FORMAT(! LIST.
        DO 4R2 I=1, NIML
         WRITE(6,403)NAMF(11,FSTAT(1)
         FORMAT(15,F8.3)
 483
 402
         CONTINUE
         IF (NUML.LE.8) STOP
         NUME .NUMF+1
         NMEL (NUME) = NAME (LRIG)
         WRITE (R, SURT (NMEL (I), I=1, NUMF)
         FURMAT (/1x, 'WILL ELIHI', 416)
 500
         IF (LRIG.FR. NUML) GO TO 310
         DO 311 TELATO, NUML
         IP1=1+1
         NAME (I) BNAME (IP1)
         00 311 J=1, NIMS
 311
         XMATR([,J)=XMATR([P1,J]
         NUML ENIML -1
 317
         KKK#1
         GO TO 312
CCCCCCCCCC
ccccccccc
ccccccc
         FORMAT (5x, 9 (3x, A2, 2x))
 100
         FORMAT (/1x, 14, 1x, 11 (2x, F5, 2) /)
 101
 192
         FORMAT(! LIST. !)
         FORMAT (AX, ISPEAKERS!/)
 183
 184
         FORMAT (/ | MEAN!, 1X, 11 (2X, F5, 21/)
```

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```
125
         FURMAT(/' S.F.',1X,11(2X,F5,2)/)
 106
         FORMATC/30X,17(1+1)/
      X30X, 1+ MEAN = 1,F6.2.1 +1/
      X13X, TOTAL ORT SCORE: +1,15X,1+1/
     X37X, 1+ S.E. = 1,F6.2,1 +1/
     X30X, (7('*'))
     FURMAT(' SYSTEM ',14,3x,3MA2//
Y5X, 'NUMBER LISTENERS =',13/
     X5X, INUMBER SPEAKERS #1,13//)
         FORMAT(1H1, 1 1)
 188
C
C
         SUBROUTINE STATS (N, XMEAN, STDERR)
         COMMON/A/IDSYS, ISYS (50), NAME (15), NPAGE (7,2,3),
     XMSPA (15, 9), MKEY, LETTER, LIST, ISPK, NIMI, NUMS, ARRAY (60), TRESP(2, 29),
     XDATA(12,6,36)
C
         Y=#.
         XNEFLOAT(N)
         DO 1 I#1,N
         X=X+ARRAY(I)
         CONTINUE
         YMEANEX/XN
         STOERRER!
         DD 2 I=1.N
         STRERRESTRERR+ (ARRAY (I) = YMEAN) + (ARRAY (I) = YMEAN)
 2
         STDERMSSORT (STDERR/XN/XN)
         RETURN
         ENO
C
C
         SUBROUTINE DUTLE (DATA, N, IP, IOUT, F, FSTAT)
        DIMENSION S(6.6), DATA(15.6), MAFAN(6), TEMP(6), SINV(6,6)
        DIMENSTON FSTAT(15)
C
        PRIP
        KEN-1
         XX mK
        KMP=K+(K-IP)
                                        THIS PAGE IS BEST QUALITY PRACTICABLE
        KSD=IP+(K+K-1)
                                       FROM COPY FURNISHED TO DDC
         XKMPEKMP
         YKSG#KSG
        RATIO=XKMP/XKSQ
        DO 184 IS1. IP
         XMEAN(I) =0.
 100
        00 101 J=1, IP
        on int lat.N
         IF(I.ED.IOUT)GO TO 101
        XMEAN(J) = XMEAN(J) +DATA(I, J)
 171
        CONTINUE
        DO 182 Jai.IP
        XMEAN(J) #XMEAN(J) /XK
 172
C
        XXMBK#1
C
        DU 183 I=1, TP
         TEMP(I)=0.
        DO 183 Jai. IP
 123
        $(1,J) .A.
         11:0
        00 184 Ist,N
```

```
IF(I.ED.TOUT) GO TO 104
         DD 105 Je1, IP
 195
         TEMP(J) =DATA(I, J) =XMEAN(J)
         00 186 Ja1, IP
         DO 186 JJ#1, IP
 186
         S(J,JJ) = S(J,JJ) + TEMP(J) + TEMP(JJ)
 104
         CONTINUE
         00 1P7 I=1, IP
00 1P7 J=1, IP
 107
         S(1,J)=S(1,J)/XKM
C
         CALL INVERS(S,SINV, IP)
C
         DO 111 J=1.IP
         TEMP(J) =DATA(IDIIT, J) = XMEAN(J)
 111
C
C
         Des.
         00 112 Tal, IP
         00 112 Je1, IP
 112
         D#D+TEMP(I)+SINV(I,J)+TEMP(J)
         KMP=K=IP
         FSTAT(IOUT) =RATIO+D
         RETURN
         END
C
C
     ********* SUBROUTINE INVERSE *********
C
C
         SUBROUTINE INVERSIA, B, N)
         DIMENSION A(6,6),B(6,6)
         EPS=. MAN1
         00 6 I=1.N
         IF(I=J)4,3,4
         B(1,J)=1.0
 3
         GUTO 5
         R(I,J) = F'R
CONTINUE
 5
         CONTINUE
         DEL=1.8
         DO 45 K#1.N
         IF (K-N) 12, 38, 38
         IMAXEK
 12
         AMAXBABS (A(K,K))
         KP1=K+1
         00 28 I=KP1.N
         DIFF = AMAX = ABS (A(I,K))
         IF (DIFF) 15.24.29
15
         IMAX=I
         AMAXBABS(A(I,K))
20
         CONTINUE
         IF (IMAX-K) 25, 38, 25
        00 29 J=1,N
 25
         ATMPEA(TMAK, J)
         A(THAX, J) BA(K, J)
         A(K,J) mATMP
         ATMPHH([HAY, J)
         B(IMAX, J) = R(K, J)
29
         R(K,J) BRTMP
        DEL SODEL
 3#
        CONTINUE
```

```
DIFFWARS(A(K,K)=EPS)
IF(DIFF)93,93,35
35
            DELMA(K,K)+DEL
           DIV=A(K,K)
DO 30 J=1,N
A(K,J)=A(K,J)/PIV
38
            B(K,J)=B(K,J)/DTV
           00 43 T=1, N
AMULT=A(T,K)
           IF (I=K)39,43,39

DO 42 J=1,N

A(I,J)=A(I,J)=AMULT+A(K,J)

B(I,J)=B(I,J)=AMULT+B(K,J)
39
49
43
           CONTINUE
45
90
           CONTINUE
           RETURN
           WRITE(4,113)
FORMAT(/** SINGULAR MATRIX **/)
93
113
           END 6
```

ALIMETER SON CONTRACTOR OF THE

SYSTEM TESTED: 1144 16-DEC-77 PROBE 1

NUMBER LISTENERS # 11 NUMBER SPEAKERS # 3

FUR LISTENER: 1277 +

SPKR SCORE

RV #0.5H JE. #9.5R RU 93.75

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FROM COLY FURNISHED FULLED

MAIN ATTRIBUTES	PRESENT		ARSENT		TOTAL	
	MEAN	S'.E'.	MEAN	S.F.	MEAN	8.E.
VOICING	100.00	9,00	87.59	5.89	93.75	2.95
FRICTIONAL .	140.00	0.00	A3.33	6.80	91.67	3,40
NON-FRICTIONAL	100.00	0.00	91.67	88.8	95,83	3.40
NASALITY	95.83	3,40	190.00	0.00	97.92	1.76
GRAVE	100.00	0.00	100.00	ดู้ดูด	130.00	0.00
ACUTE	91.67	6.89	100.00	คู่ลด	95,83	3,48
SUSTENTION	R3_33	6,86	58.33	3.40	70.83	4.58
VOICED	75,00	11.79	50.00	20.41	62.58	11.79
UNVOICED	91.87	6.80	66.67	13.61	79.17	3,40
SIRTLATION	95.83	3.40	100.00	0.00	97,92	1.78
VOICED	100.00	0.00	100.00	0.00	100.00	0,99
UNVOICED	91.67	6.89	100.00	9 98	95,83	3.48
GRAVENESS	91.67	3,40	79.17	9.00	85.42	3,40
VOICED	120 00	0.00	100.00	0.00	100.00	P.80
UNVOICED	83.33	6.88	58.33	18.00	79.83	6.80
COMPACTNESS	100,20	9,00	100.00	0.00	190.89	9.8F
	100.00	0.00	เกต ดด	ด ดด	100.00	0,00
VOICED	•	-	100.00	0 00	100.00	0.78
UNVOICED	100.00	0.00	ful) • un	का के बांगा	र्मका व क्रास	41 4 41 40
TOTALS	94.44	2.27	87.50	P.PP	90.97	1.13

TOTAL DRY SCORF1 .

* MFAN # 90.97 *

+ S'.E'. = 1.13 +

SYSTEM TESTED: 1104 16-DEC-77 PROBE 1

NUMBER LISTENERS # 19 NUMBER SPEAKERS .

***** FOR LISTENERS 3345 .

SPKR SCORE

BV PA.54 JE 85.50 ₽D 93.75

MAIN ATTRIBUTES PRESENT ABSENT TOTAL MEAN S.E. MEAN S.E. MEAN S.E. VOICING 95.83 91.67 100.00 83.33 3.40 6,80 93,75 5.10 FRICTIONAL 140.04 0.00 9.99 13.61 100.00 8.00 NON-FRICTIONAL 91.67 6. AP 87,50 18.21 NASALITY 166,96 a. ac 95.83 91.67 3.49 97.92 1.70 GRAVE 0.00 IND. PR 6'.89 0.09 95,83 3,40 ACUTE 140.00 0.00 100.00 107.90 0.90 SUSTENTION 58.33 12.27 75.00 5,89 65.67 8.51 VOICED 50.00 11.79 75.00 75.00 11,79 62.59 79.83 10.21 UNVOICED AA 67 18.00 11.79 6.80 SIBILATION 9.48 79.17 100.00 4,50 A. PP 49.56 VOICED 75.00 100 00 100 00 11.79 0.00 87,50 5.59 UNVOICED 93.33 13,61 9. 99 91.67 6.80 GRAVENESS 91.67 3.40 70,83 3,40 A1.25 2.95 VOICED 140.00 P. PP 0.00 6.80 100.00 6.44 100,00 UNVOICED M3.33 6.80 41.67 62.59 5,89 COMPACTNESS 100.00 0.00 100.00 0.00 100.00 ... VOICED 100.00 P.PP 100.00 9.00 P,80 199.98 UNVOICED 1 MP . MR 0.00 100.00 107.88 9.00 ... TOTALS A7.50 3.93 58.89 1.50 44.19 2.78

> . MFAN . BR.19 . TOTAL DET SCORES • S.E'. . ***********

2.70 .

The state of the s

SYSTEM TESTED: 1194 15-0FC-77 FRORE 1

NUMBER LISTENERS # 11 NUMBER SPEAKERS # 3

FUR LISTENERS 4A95 .

SPKR SCORE

BV 68.54 JE 68.21 RO 92.71

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MAIN ATTRIBUTE:	PRESENT		AHSENT		TOTAL	
	MEAN	S.E.	MEAN	S.F.	MEAN	5.E.
VOICING	. Ian ann	a_ua	91.67	6.88	95.83	3.40
FRICTIONAL	196.00	0.02	91.67	6,80	95,83	3.40
MONEPPICTIONAL	190,00	3,66	91.67	ค_ื8ฅ	95,83	3.40
NASALITY	194,46	7.80	100.00	0.00	100.00	0.38
GHAVE	140.44	0.00	100.00	0.00	120.00	0.00
ACUTE	140.44	0.00	1011.00	4.00	100.00	0.00
SUSTENTION	59,33	9.00	52.52	5.89	60.42	7.41
VOICED	50.00	20.41	41.67	18,00	45,83	14.83
UNVOICED	66.67	13,61	#3,33	13,61	75.40	0.00
SIBILATION	64.67	12.27	190.00	4.00	M3.33	6.13
VOICEO	83.33	A AP	100,00	ด้อน	91.67	3,40
ひみないましたり	70.00	20.41	100,00	0.00	75.00	19.21
GRAVENESS	91.67	6.80	70.17	3.44	R5.42	1.70
VDIČED	INC. CH	0.00	109.90	คุดก	100,00	0.00
I-NAUICED	93,33	13,51	54,33	5.89	78.43	3.48
COMPACTNESS	95,83	3,40	100.00	P_8P	97.92	1.70
VOICED	100.00	0.00	100.00	หั้ดถ	140.00	9.00
UNVOICED	91.67	6.80	100.00	0.00	95.43	3.40
TUTALS	P5.42	4.50	88.89	1.50	87.15	3.00

+ MEAN # 87.15 + TOTAL DRT SCORP: + ...

* S.E. # 3.00 *

SYSTEM TESTED: 1144 16-DEC-77 PROBE 1

NUMBER LISTENERS # 11 NUMBER SPEAKERS # 3

FOR LISTENERS 5345 .

SPKH SCORE

9V P7.50 JE P4.37 RU 94.79

MAIN ATTRIBUTE:	PRESENT		ARSENT			TOTAL	
	MFAH	S'.E'.	MEAN	S.F.	MEAN	5.E.	
VUICING	104.00	4.90	91.47	6 40			
FRICTIONAL	130,00	0.00	91.67	F. AU	95,83	3.4P	
NON-FRICTIONAL	1:10 (0)	0.04	91.67	6.80 6.80	95.83 95.83	3.40	
ALA É AL TTU					40,00	3.48	
NASALITY	160.66	9.40	100.00	P. AA	100.00		
CRAVE	100,00	0.00	109.00	0.00	_	P.98	
4 (1176	170.00	P. 40	100.00	n , nn	100.00 100.00	0.88 8.88	
SUSTENTION	75,00				•		
VOICED	-	5.80	66.67	9.09	74.83	6.80	
HNVOICED	hh.67	13,51	54,33	18.00	62.50	15.59	
	83,33	6.84	75,90	11.79	79.17	3,48	
SIRILATION	87.50	A_UP	100.00				
AUICEN	83.33	A . Ru	-	0.00	93,75	0.0p	
UNVOICED	41.67	-	100.00	0.00	91,67	3,40	
	41.57	4.50	164,66	7.00	95,83	3,40	
GRAVENESS	46.67	9.40	79.17	7 40			
AUICEN	100.00		100.00	3.48	72.92	5.13	
HANDICED	33,33	18.00		a . na	100.00	0.00	
	• • • • • • • • • • • • • • • • • • • •	100	58.33	6.80	45,83	12.27	
COMPACTNESS	104.46	v. 00	100.00			_	
VOICEN	1.10.00		100.00	P. AP	1 ଜଗ.ଗ୍ର	P. PP	
UNVOICED		0.00	100,00	0.00	100.00	A. 46	
	tub"ua	ሮ መም	104.00	0.00	100.00	9.86	
TOTALS	Au 10	2.47	A9.5A	2.80	88.89	2.52	

TOTAL ORT SCORE: .

* MFAM = RR.RO *

• S.E. = 2.52 •

SYSTEM TESTED: 1194 15-DEC-77 PROBE 1

NUMBER LISTENERS = 11 NUMBER SPEAKERS = 3

FOR LISTENER: 5406 +

SPKR SCORE

RV #6,46 JE #8.54 RD 98.62

FROM COPY PULC.

CARIN

MAIN ATTRIBUTE:	PRESENT		ABSENT		TOTAL	
	MEAN	S.E.	MEAN	S.E.	MEAN	S.E.
VUICING	100.00	ด๋ตด	83,33	9.00	91.67	4.50
FRICTIONAL	190.00	0.00	83.33	5.80	91,67	3,40
NON-FRICTIONAL	tanan	P.00	A3,33	13,61	91,67	6.80
NASALITY	140.70	ผ ู ่ วะ	190.00	0.00	100,00	0.00
GRAVE	100.00	6.20	100,00	0 00	100.00	R.80
ACUTE	170.00	C.00	100,00	0.00	100.00	0,00
SUSTENTION	79.17	9 . 100	58.33	6.80	AR.75	2.95
VOICED	66.67	13.61	50,00	0.00	58,33	6,88
UNVOICED	91.67	6.80	66.67	13.61	79.17	3,40
SIBILATION	95.83	3:40	100.00	0.00	97,92	1.70
AU1CFU	100,00	0.00	100.00	4 . AA	100.00	0.00
UNVOICED	95.67	F. 80	100.00	ดูเลด	95,83	3.49
GRAVENESS	66,67	3.40	79.17	9.00	72.92	6.13
VOICED	91.67	F.AP	100.00	9.49	95,83	3.40
UNVOICED	41.67	E.Bu	58.33	18.00	50.00	11.79
COMPACTNESS	101.00	B. 9P	100.00	P.PP	100.00	P.88
VOICED	1 140 . 00	0.00	100.00	กัดด	100.00	P.00
PANUTCED	100,00	9,00	100,00	PERM	190.00	0,00
TOTALS	94.28	1.50	86.81	1.50	AR.54	A.98

TOTAL DRT SCHRES +

MFAN = 88,54

+ S.E. # 0.98 +

SYSTEM TESTED: 1194 JR-DEC-77 PROBE 1

NUMBER SPEAKERS # 11

FOR LISTENEY: KUM4 .

SPKR SCORE

RV 89,58 JE 87.50 RD 95,83

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MATH ATTRIBUTE:	PPERENT		ARSENT		1	TOTAL	
	MEAN	S.E.	MEAN	S.F.	MEAN	S.E.	
VOICTNG	100,00	0_00	95.83	9 40		. •	
FRICTIONAL	1.40 .00	0.00	91,67	3.40	97.92	1.70	
NOH-FRICTIONAL	100.00	0.00	100.00	6.80 0.00	95.83 147.80	3.40 9.00	
MASALITY	104,40	1.00	95.83	3,40			
GRAVE	1:11 014	0.00	91.67	• .	97.92	1.70	
ACUTE	1 16 600	u = u	100.00	6.8m #_09	95.83 100.00	3.40 0.00	
SUSTENTION	79,17	0.00	70 87	•		•	
VOICED	54.33	18.00	70.83 75.00	3,40	75.00	5.89	
UNVOICED	100.20	r .eu	66.67	11.79	46, <i>87</i> 43,33	13.61 6.80	
\$181647100	87.50	5 98		-	-	₩ • • • •	
VUICEN	01.67	5.80	100.00	P.09	93.75	2,95	
UNVOICED	•	F. An	1017,30	A.90	95.83	3,48	
	93.33	13,61	100.00	0.04	91.47	4.88	
GRAVENESS	91.67	5.50	70.83	3.40	P1.25		
VOICEN	91.47	R BIE	103.00	и ап	•	2.95	
114401050	91.67	R. BR	41.67	5 . BR	95.83 88.87	3.49 3.49	
COMPACTNESS	104.00	<u> </u>	100.00				
votcep	tan en	0.00	100 00	D DIA	140.30	ย ูดดู	
UNVOICED	100,00	0.00		4.40	190.00	0.00	
<u> </u>	•	1. • 1r 3r	100.00	u • u u	King Pru t	0.00	
TOTALS	an Fo	3.00	28,89	1,13	00.97	2.94	

TOTAL PHT SCHUF: + S.E. # 2.04 .

SYSTEM TESTER: 1134 16-DEC-77 PRORE 1

NUMBER LISTENERS # 11 NUMBER SPEAKERS # 3

FOR LISTENERS AND +

SPER SCORE

RR.54 RR.21 92.71 THIS PAGE IS BEST QUALITY PRACTICABLE ٩v jŁ FROM COPY PURMISHED TO DDC RI)

80 92.71	PRESENT		MT	101	AL 3.E.	
	PRES	55 " 1				
MAIN ATTRIBUTE:		S.E.	MEAN	5.F.	MEAN	0,6.
	AF AN	3.6.			47.50	9.8F
		6 AP	83,33	6.88	79.17	3.48
VOICING	91.57	A BB	66.67	13.61	95.83	3.48
FRICTIONAL	41.67	8.80	107,170	@	43400	
A DN-FRICTIONA	91.67	6. * L.n.			_	9,98
Y UNSER A Till I TOLLA	-		40	0.00	100.00	M . D.V
	100.00	0.00	100.00	9 00	100.00	0.00
NASAL ITY	4.44. (1.4	(4 . P P	100,00	0.40	100.00	8,88
GRAVE	140.00	P. P. FI	100.00	W. NO	144	
ACUTE	9 (4 M . M M					14.63
at 314		-	54.17	14.83	K4.58	18.00
	75.40	(5,59	33,33	24.53	54.17	11.79
SUSTENTION	75.0P	11.79	75.00	11.79	75.90	3 7 0 4 -
VOICED	75.00	24.41	12 *AL			
UNAUTLEA				a . a a	95.83	1.78
		3.40	100.00	N N N	95,43	3.48
SIRILATION	61.67	6.84	(00,00	8.68	95.83	3.40
VOICED	91.67	. 90	្តែក ់ក្	a , aa	47,70	. •
VIII G F F	91.67	A.87	• •			1.78
UNVOICED			70 47	6,89	77.0A	9,99
	75.40	5.89	70,17	ตั้นด	100.40	
GRAVENESS	140.00	0.77	100.00	13.61	84.17	3,40
vataen	50.00	11.79	59,33	10.	-	
LAVOICED	20.00	• •			97.97	1.70
, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		p.aa	95.83	7.48	4/	
	100.30	7	MA. NO	6,94	100.50	
COMPACTABLE	144.64	6.68		6,8#	95,83	5,40
volet p	1 40 06	2.00	41.07	•		
114401060	, . •			a_98	87.15	3.00
	, ga_mo	5,04	85.42	W	- '	
TOTALS	- A					
10180			*******	*		
		MFAN	g A7.15	•		
		• MENO	• •	•		

TOTAL DET SCHRET .

SYSTEM TESTED: 1104 16-DEC-77 PROBE 1

NUMBER LISTENERS = 11 NUMBER SPEAKERS = 3

FOR LISTENER! BORG .

SPKR SCORE

8V 91.67 JE 98.62 RD 91.67

MAIN ATTRIBUTE:	PRESENT		ARSENT		TOTAL	
	MEAN	S.F.	MEAN	S.F.	MEAÑ	5,E.
VOICING	16%_00	a	95,83	3,40	97,92	1.70
FRICTIONAL	100,00	0.00	100.00	0.09	199,39	9.00
NON-FRICTIONAL.	jua an	0.00	91.67	6.84	95,83	3.40
NASALITY	100.00	a_ne	95,83	3.40	97.92	1.70
GRAVE	Jep.cu	6.00	91.67	6.80	95,83	3,40
ACUTE	100.00	0.00	104.00	ดูดด	100.00	0,00
SUSTENTION	91.67	3.40	75.00	0.00	43,33	1.78
VOICED	43.33	6.80	A3.33	13,61	63,33	9.29
- UNVOICED	140.00	0.00	66.67	13,61	83,33	6.89
SIBILATION	79.17	3.4P	95.R3	3.49	87.5%	2.95
VOICED	43.33	A.PA	100,00	0.00	91.67	3,40
UNVOICED	75.00	11.79	91.67	6.8m	83,33	6,80
GRAVENESS	P7.50	5,80	75.00	18.21	81.25	2.95
VOICED	196.00	r. 00	100.00	ต่อก	199,99	0,00
UNVOICED	75.00	11.79	50 00	28.41	A2.58	5,89
COMPACTNESS	100.00	a'.ee	100.00	0.00	100.90	8.88
VDICEO	100.00	0.00	100.00	0,30	199.88	0. PF
UNVOICED	140.00	0.00	109 00	а па	100.00	0.00
TOTALS	93.06	1.50	69,58	80,0	91.32	0.28

+ MFAN = 91.32 + TOTAL DRT SCHRE: + + + S'.E'. = 0.28 +

SYSTEM TESTED: 1184 16-DEC-77 PROBE 1

NUMBER LISTENERS # 11 NUMBER SPEAKERS # 3

FOR LISTEMFR: 9339 +

SPKR SCORE

1911年からは機構を終めていませる。1960年

OF STREET

MAIN ATTRIRUTE:	PRESENT		ABSENT		TOTAL	
	MEAN	S.E.	MEAN	S.F.	MEAN	S.E.
VOICING	104.00	0,00	91.67	6.88	95.83	3.40
FRICTIONAL	100.00	0.00	100.00	กัดด	100.00	P.00
NON-FRICTIONAL	100,00	0,00	P3.33	13,61	91.67	6.80
NASALITY	95.83	3,40	100.00	a.au	97.92	1.70
GRAVE	91.67	6.80	1011,00	ด้อด	95,83	3,49
ACUTE	100.00	0.00	100.00	ดู้ดูด	100,90	P. P9
SUSTENTION	75,00	11.70	66.67	13.61	70.83	12.27
VOICED	25.00	11.79	รตั (เต	23.57	62.58	15,59
UNVOICED	75,00	11.79	A3.33	13.61	79,17	12,27
SIRILATION	95.43	3.40	100.00	0.00	97.92	1.70
VOICED	91.67	A. AU	100,00	4.40	95,83	3.40
UNVOICED	140.00	n.er	100.00	o an	100,00	P.88
GRAVENESS	79,17	9.00	75.00	5,89	77.08	4.58
VOICED	190.00	6.00	104.00	กุหต	100.00	0.00
UNVOICED	58,33	18.00	ัธต"ูดต	11.79	54,17	9.88
COMPACTNESS	104.00	0_00	100.00	0.0 0	100.00	8 . PP
VOICED	100.00	n 00	100 00	ด้อด	100.00	0.00
UNVOICED	160.00	6.66	100.00	0 00	100.00	ดู้ดด
TOTALS	90.97	3,97	88.89	2.84	89.93	3.34

+ MFAN # 80,93 + TOTAL DRT SCORF: + +

* S.E'. # 3.34 *

SYSTEM TESTED: 1104 16-DEC-77 PROBE 1

NUMBER LISTENERS # 11 NUMBER SPEAKERS # 3

FOR LISTENER: 9463 +

SPKR SCORE

91,67 98,62 98,62 44

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MAIN ATTRIBUTE:	PRESENT		ARSENT		T	DTAL
	MFAN	S'.F'.	MEAN	S.E.	MEAN	S'.E'.
VOICING	95.83	3,40	95.83	3.49	95.83	1.70
FRICTIONAL	100.00	0.00	91.67	6.80	95,83	3.40
NON-FRICTIONAL	91.67	A.AH	100.00	0.40	95,83	3.40
NASALITY	100.00	14 . P.P	1 44.44	0.00	100,09	9.00
GRAVE	100.00	P. 00	100.00	0,00	198.86	0.00
ACUTH	140.00	0.00	100.00	กู้ดด	199.99	0.00
SUSTENTION	75.00	10,21	79.17	3.49	77.48	4.58
VOICED	66,67	18.00	75.00	11,79	70.83	6,80
UNVOICED	83,33	13,61	83,33	6,89	43,33	3,40
SIBILATION	05.83	3.40	95.83	3.40	95.83	1.70
VOICED	100.00	0.00	91,67	6,80	95,83	3.40
UNVOICED	91.67	6.80	100.00	ด้ดด	95.83	3,40
GRAVENESS	79.17	3.40	75.00	5,89	77,08	4.58
VOICED	190.00	ពួកគ	100.00	ดับต	100.00	0.00
UNVOIGED	58.33	A. AA	้รด ้ดด	11.79	54,17	9,00
COMPACTNESS	104.00	9,00	100.00	P.PU	100.00	0.00
VOICED	100.00	0.00	100.00	0.00	100.00	0.00
UNVOICED	100.00	0.00	100.00	0.90	100.69	A, 46
TOTALS	94.97	2.04	90.07	2.27	98,97	A.28

TOTAL DRT SCORE: +

+ MEAN = 90.97 +

. S.E. . P.28 .

SYSTEM TESTED: 1104 16-DEC-77 PROBE 1

NUMBER LISTENERS = 11 NUMBER SPEAKERS = 3

FOR LISTENER: 9557 +

SPKR SCORE

HV #9.58 JE #9.58 RD 92.71

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MAIN ATTRIBUTE:	PRESENT		ABSENT		TOTAL	
	MEAN	S.E.	MEAN	5.F.	MEAN	S.E.
VOICING .	100,40	0.00	83,33	3,46	91.67	1.70
FRICTIONAL	100.00	0.00	83,33	6.80	91.67	3.40
NON-FRICTIONAL	100.00	0.00	83.33	6.88	91,67	3.48
NASALITY	100.00	0.00	100.00	0.00	190.00	0.00
GRAVE	140.00	0.00	100.00	ดูสด	100.90	0.00
ACUTE	100,00	n . RH	100.40	ครู้ผล	100,00	0.00
SUSTENTION	79.17	9.40	66.67	3.49	72.92	6.13
VOICED	58.33	18.00	56.33	13.51	58,33	14.83
UNVOICED	100.00	0.00	75.00	11.79	87.50	5,89
SIBILATION	91.67	3.40	100.00	0.00	95.83	1.70
VOICED	91.67	6.80	100.00	ด้อด	95,83	3.40
UNVOICED	91.67	8 . BB	100.00	ดูดด	95,83	3,40
GRAVENESS	79.17	3.40	87.50	5,89	A3.33	1.78
VOICED	91.67	6.80	100.00	0.00	95,83	3.49
UNVOICED	66.67	13.61	75.00	11.79	78.83	3.40
COMPACTNESS	100.00	0,00	100.00	0.00	100.00	P. 0P
VOICED	140.00	0.00	100.00	0.00	100.90	0.00
UNVOICED	100.00	0.00	100.00	п. ая	100.00	ଗ୍ରମ
TOTALS	91.67	2.68	89,58	R. 98	98.62	W.85

TOTAL DRT SCORES .

+ S.E. # Ø.A5 +

SYSTEM TESTED: 1184 18-0EC-77 PROBE 1

NUMBER SPEAKERS = 11

FUR SPEAKER: JE .

LISTENER	SCORE
1277	89,58
3345	82.20
4026	80.21
5345	84.37
5496	88.54
6004	87.50
4854	80.21
8856	94.69
9339	A7.50
9463	93.62
9557	89.58

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MAIN ATTPIRUTE:	PRESENT		ARSENT		T	TOTAL	
	MFAR	S.F.	MEAN	S.E.	MEAN	S.E.	
VOICTHE	45,45	2.42	81.82	3.36	A6,64	1.35	
FRICTIONAL	97.73	2,17	88.64	3.75	93.18	1,88	
NON-FRICTIONAL	93,18	3.36	75.00	5.57	84,89	2.63	
NASALITY	100.00	n _ ហ្គ	95.59	1.68	98.30	0.84	
GRAVE	100.00	0.00	93.18	3.36	96.59	1.68	
ACUTE	100.00	0.00	100.00	9.99	100.00	0.00	
SUSTENTION	61.36	4.94	61.36	4,67	61.36	4.00	
VOICED	54.55	8.40	25.00	7.87	39.77	5,04	
FINAUICED	AR. ! P	7.93	97.73	2.17	A2.95	4,62	
SIRILATION	79,55	4.80	100.00	0.00	89.77	2.45	
VOICEĎ	93.14	3,35	100,00	พื้อต	95.59	1.68	
UNVOICED	45,91	8.05	104.00	0.00	82,95	4.02	
GRAVENESS	73.86	3.30	68.64	2.99	91.25	2.54	
VOICEN	97.73	2.17	100,00	ดิตต	98.86	1.00	
NNAGICED	รีต ์ คต	7,19	77.27	5.97	63,64	4.94	
COMPACTNESS	100.00	9.00	98.86	1.08	09.43	P.54	
VOICED	100,00	0.90	100.00	0.00	100.00	P. PR	
UNVOICED	100.00	0.00	97.73	2.17	98.86	1.84	
TOTALS	85.24	1.60	87.88	ø. 96	A6.46	1.15	

+ MFAN = RR,4R + TOTAL DRT SCORE: + + S.E. = 1,15 +

SYSTEM TESTED: 1144 16-DEC-77 PROBE 1

NUMBER LISTENERS = 11 NUMBER SPEAKERS = 3

**** FOR SPEAKERS BV . **** SCORE LISTENER 89.5A 89.58 88.54 88.54 87.50 86.46 89.58 88.54 91.67 84.37 91.67 1277 3345 4426 5345 5406 5004 4854 THIS PAGE IS BEST QUALITY PRACTICABLE 986 FROM COPY FURNISHED TO DDC 9339 9463 9557

MAIN ATTRIHUTES	PRESENT		ABSENT		TOTAL	
	MEAN	S.E.	MEAN	5.F.	MEAN	S.E.
VOICING FRICTIONAL	100,00 100,00	6, 66 6, 66 6, 66	94.32 88.64 180.68	2.47 4.94 2.00	97.16 94.32 100.00	1.24 2.47 0.00
NON-FRICTIONAL NASALITY GRAVE	170.00 97.73 97.73 97.73	1.45 2.17 2.17	100.00 100.00 100.00	0.00 0.00 0.00	98.86 98.86 98.85	0.73 1.88 1.88
SUSTENTION VOICED UNVOICED	69.32 45.45 93.18	3.72 5.48 4.65	61.36 79.45 52.27	3.39 5.40 2.17	65.34 57.95 72.73	2.46 3.32 2.70
SIBILATION VOICED	88.64 79.55 07.73	2.52 4.33 2.17	100.04 100.04 100.04	0.00 0.00 0.00	94.32 89.77 98.86	1.26 2.17 1.88
UNVOICED GRAVENESS VOICED UNVOICED	81.82 100.00 83.64	4'.P5 n.pp p.11	72.73 100.00 45.45	7.70 0.00 5.40	77.27 199.59 54.55	2.31 0.00 4.62
COMPACTNESS VOICED	98.86 100.04 97.73	1.0A 0.00 2.17	100.00 100.00 100.00	0.00 0.00 0.00	9.43 188.88 98.86	0.54 8.88 1.86
UNVOICED TOTALS	PF. DA	0.82	88.07	28.9	88,73	n,61
		******	*********	-		

TOTAL ORT SCORES + 5.E. P 0.61 +

The second secon

SYSTEM TESTED: 1104 16-DEC-77 PROBE 1

NUMBER LISTENERS = 11 NUMBER SPEAKERS = 3

FUR SPEAKERS RD .

LISTENER	SCOPE
1277	93.75
3345	93.75
4025	92.71
5345	94.79
5446	90.62
5894	95,83
6854	92.71
8865	91.47
9339	97.92
9463	90.62
9547	92.71
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MAIN ATTRIBUTE:	PRESENT		ABSENT		TOTAL	
	MEAN	S.E.	MEAN	S.E.	MEAN	S.E.
VOICING	180.80	0.00	94.32	2.95	97.16	1,47
FRICTIONAL	100.00	የ. የ ም	90.91	4.85	95,45	2.42
NON-FRICTIONAL	120.00	9,46	97,73	2,17	98,85	1.88
NASALITY	103.00	น่อด	100.00	0.00	100.00	0.00
GRAVE	140.00	0.00	100.00	0.00	100.00	0.00
ACUTE	190.09	r.ap	100.00	4.44	100.00	0.00
SUSTENTION	95.45	2.42	77.27	3.88	86.36	2.19
VOICED	97.73	2.17	81.82	5,65	A9.77	2.79
UNVOICED	93,18	4,65	72.73	5.97	92.95	2.91
SIBILATION	95.45	2.42	97.73	1.45	96,59	1.68
VOICED	97.73	2.17	97.73	2.17	97.73	1.45
NANJUCED	93,18	3,36	97.73	2.17	95,45	2.42
GRAVENESS	89.77	3,55	70.45	2,42	80.11	2.10
VOICED	95.45	2.01	180,80	9.99	97.73	1.45
UNVOICED	84.09	5.61	40.91	4.85	52,50	3,94
CUMPACTHESS	187.88	0.00	100.00	9,00	100.00	0.AP
VOICED	100.00	e an	100.00	0.00	100.00	0.00
UNVOICED	100.00	0.00	100.00	A . AA	100.00	0.00
TOTALS	95.78	0.73	80.96	1.83	93.37	A.63

OTAL DRT SCORF1 + S'E' = R.63

NUMBER LISTENERS = 11 NUMBER SPEAKERS = 3

COMBINED PESULTS - STANDARD ERRORS ACROSS SPEAKERS AND LISTENERS ******

MAIN ATTRIBUTE:	PRESENT		ABSENT		TOTAL	
	MEAN	S.E.	MEAN	S.E.	MEAN	S.E.
VOICING	94.48	9.89	90.15	1.99	94.32	1.05
FRICTIONAL.	99.24	9.75	89.39	2,63	94.32	1.32
NON-FRICTIONAL	97.73	1,25	91	2,80	94.32	1.62
NASALITY	99.24	9.52	98.86	0.63	99.05	и.39
FRAVE	99.24	0.75	97.73	1.25	99,48	8.71
ACUTE	99.24	0.75	100 00	ดีตด	99.62	P.37
SUSTENTION	75.3ª	3.37	66.67	2.66	71.02	2.57
VOICED	65,91	4.77	59 N9	5,65	62.50	4,22
LINVOICED	AA.R5	4.00	74.24	3,93	79,55	2.20
SIBILATION	87.88	2.30	99.24	0.52	93.56	1.18
VOICED	90.15	2.38	99.24	0.75	94.70	1.28
UNVOICED	85,61	3,87	99.24	0.75	92.42	5,44
GRAVENESS	81.82	2.40	77.27	2.11	79.55	1.37
VOICED	97.73	1,25	100.00	9.00	98,95	0,63
UNVOICED	65.91	4,77	54.55	4.21	69.23	2.78
COMPACTNESS	99,62	0.37	99.62	P.37	99.63	0.25
VOICED	100.00	0.70	100,00	0.00	124.80	0.00
UNVOICED	90.24	9.75	09.24	0.75	99.24	0.52
TOTALS	90.40	1.06	88,64	P.57	A9.52	0.79

+ MFAN # 89,52 + TOTAL DRT SCORE: + + S.E. # 0.70 +

8v JF RD MEAN 88.73 86.46 93.37 S.E. 0.61 1.15 P.63

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SYSTEM 1104 16-DEC-77 PROBE 1

NUMBER LISTENERS = 11 NUMBER SPEAKERS = 3

SPEAKERS

	BV	JE	RD	MEAN	S.E.
LIST.					
1277	89.58	89.5R	93,75	ap.97	1.13
3345	88,54	R2.29	93,75	88.19	2.79
4026	88,54	B0.21	92.71	87.15	3,00
5345	87.50	84.37	94.79	89.80	2.52
5406	. AF. 46	R8.54	90.62	88.54	a.98
5004	89.58	#7.50	95,83	90.97	2.04
5854	RR.54	AH.21	92.71	87 ₊ 15	3.00
9066	91.67	90.62	91.67	91.32	0.28
9339	84.37	87.50	97.92	89.93	3,34
9463	91.67	94.62	90.62	90.97	R.28
9557	89,58	80.58	92.71	90.52	P.A5
MEAN	88.73	AF.4F	93,37		
5.E.	9.61	1.15	0.63		

+ MEAN = 89.52 + TUTAL DRT SCORE: + + S.E. = 0.70 +

Appendix D

Use of Listeners and Behavioral Controls in the In-House Diagnostic Rhyme Test Evaluation

Lt. John J. Bowen Speech Processing Lab Hanscom AFB, Massachusetts 5 November 1976

D1. INTRODUCTION

The purpose of this report is to review the behavioral aspects of handling listeners for an in-house evaluation capability of the Diagnostic Rhyme Test.

The Diagnostic Rhyme Test (DRT) uses a group of trained listeners involved in a speech discrimination task. The test is designed to compare speech intelligibility between voice communication systems; digital voice processers in this case. The comparison is based upon the listeners' reception, recognition, association, and response of the processed stimulus. Since the validity of the DRT depends on human behavioral processes, which are variable from one listener subject to the next, the use of test controls to minimize these individual variables should improve the consistency and reliability of test results.

The test controls covered in this report will include the experimental effects of the test situation. Fxperimental effects are the sum of variables introduced into

the test situation by the test administrator, the test subjects, and the test environment itself. A brief section on listener selection and preparation will be included also. Continued research is needed in the areas of listener training and performance tracking to improve the control of consistent results. The report will close with conclusions and recommendations on the handling of listeners for in-house DRT evaluations.

D2. EXPERIMENTAL EFFECTS

As mentioned previously, experimental effects are the summation of all the outside variables contributed by the test administrator, subjects, and environment which contribute to the biasing of the test results. Ideally, a test should measure only those characteristics intended to be measured. Differences among individuals and environments however, can influence and alter test results. If controls can be placed upon the test situation, experimental or test effects can be minimized.

D2.1 Administrator Effects

From research in experimental design and testing, Rosenthal concludes that a variety of biosocial, psychosocial and social psychological factors which interact between the test administrator and his subjects can effect the subjects' behavior and response. Physical characteristics such as age, sex, race, etc. and personality characteristics such as anxiety, hostility, warmth, dominance, etc. can alter the way a subject responds to the administrator and the test itself. The nature of the DRT however, tends to minimize administrator effects. After the initial training period, the listener subjects know how the test is administered and what the administrator expects of them. When a series of DRTs are being conducted, only one administrator should give the test. It is possible that listener responses could be influenced by a change of test administrators in a test.

The test administrator can influence subjects very easily in the instructions he gives them, according to Rosenthal ¹. He also points out that a test of simple data collection can be biased by the experimentor or administrator. ¹ The administrator must be careful not to tell the listeners anything which could influence their responses. Voiers said that the listeners should not be told their test scores or should never be told to try harder on one test than others. ² Listeners should not be told how many tests are left in a series or how much longer they have until the end of a test. The administrator should never give a subject any doubt that he may fail to be a good listener or that he mill be removed from the program if he cannot

^{1.} Rosenthal, R. (1966) Experimental Effects in Behavioral Research, Appleton-Century-Crofts, New York.

^{2.} Interview with W.D. Voiers on 28 Sept 1976 at Dynastat, Austin, Texas.

perform adequately. Any such instructions could influence a listener's motivation or attention and cause inconsistent, and thus, unreliable performance.

The best method to control administrator effects is to develop and use standardized procedures for the administration of the DRT.

D2.2 Environmental Effects

Environmental effects are all physical variables present in the test situation which can affect a subject's response. Environmental effects include the comfortability of the test room, temperature, lighting, quietness distractions, etc. A change in one of these variables can decrease a subject's attention to the task and affect the subject's response.

If the environment is kept constant, the listener will know what to expect and will be able to keep his attention focused on listening. Before the test starts, the administrator should insure that the shades are down in the test room, the partitions between the booths are drawn, distractions are removed from the room, headphones work properly, volume is adjusted comfortably, room temperature is comfortable, and that listeners are supplied with the necessary pens and answer sheets. Voiers asys the DRT is insensitive to volume level but he uses an average vowel peak level of 80 db SPL in his tests. Comfortable room temperature for working is between 70 and 74 degrees. Precautions should be taken to insure that all test booklets are complete. Speaker tapes should be introduced and started the same way so the listeners are not taken by surprise when the tape begins. With the presentation of all the testsstandardized, the listeners will not have to worry about distractions which would influence their attention and response.

D2.3 Subject/Listener Effects

Subject effects can be the most variable of the three effects in a test situation. Personality differences among individuals cause them to respond differently in the test situation. The number of speakers and listeners in the DRT tend to minimize listener effects. Controls on listeners' motivation, attention, and expectancies should increase test reliability although studies have not been performed to support this hypothesis.

Listeners' motivation and attention will be discussed as part of listener effects. Rosenthal proposes that individuals who volunteer for studies have three aims or motives which vary among individuals. These aims will also be discussed in this section regarding their impact on listener effects.

Voiers, W. D. (1967) Performance Evaluation of Speech Processing Devices, III.
 Diagnostic Evaluation of Speech Intelligibility, Final Report, Contract
 No. AF19(628)4987.

D2.4 Motivation

Individuals must be properly motivated to do a task or they will not do it well. Subjects can find both extrinsic and intrinsic motivation in a task like the DRT listener program. Extrinsic motivation includes pay or recognition. For example, letters of appreciation can be sent to the listeners' supervisors. Intrinsic rewards derive from a personal sense of satisfaction, accomplishment, or providing a useful service. Past volunteer listeners have expressed a feeling of high self-satisfaction in participating in the program. Motivation should not be a problem in the in-house DRT program.

D2.5 Attention

Span of attention can vary from one listener to the next. Listeners should understand that they should try to pay an equal amount of attention throughout tests. Listeners who try harder on some tests than others will yield inconsistent results.

Attention is largely a variable of time. Swets and Kristofferson⁴ point out that there are conflicting opinions as to the decrement of word identification performance vs time. Baker says that the "auditory sense is relatively slow to fatigue".⁵

Woodworth and Schlosberg⁶ found that subjects may experience "blocks" in a mental task. Blocks are defined as a person's momentary inability to focus attention. They are involuntary rest periods which delay the onset of fatigue. Rest periods should be used in a test to prevent blocks from occurring since they could cause unwanted variations in test performance.

Voiers uses two groups of listeners and alternates the groups in 20-min work/ 20 min rest periods for his DRT listeners. He uses 3 to 4-hr sessions.

In-house studies have shown that sets of 20 min work/10 min rest/20 min work periods are most efficient for test with one group of listeners. A minimum of at least 15 min break should be given between these sets.

D2.6 Three Aims of Test Subjects

As was mentioned in the introduction of this section of the report, Rosenthal suggests that there are three reasons or aims of people who volunteer for studies or tests. ¹ These three aims are related to subject effects upon a test. These aims should be satisfied to minimize the individuals' effects upon the test.

^{4.} Swets, J. A., and Kristofferson, A.B. (1970) Attention, Annual Review of Psychology, 21:339-366.

Baker, L. M. (1960) General Experimental Psychology, Oxford University Press, New York.

^{6.} Woodworth, R.J., and Scholsberg, H. (1965) Experimental Psychology revised, Holt, Rinehart and Winston, Inc., New York.

First, test subjects expect to receive a reward for participating in the study. The different types of extrinsic and intrinsic rewards and their effects have been discussed previously under the topic of subject motivation.

Second, test subjects are usually interested in discovering the rationale behind the test. In some studies, the administrator does not want the subjects to know what they are being tested on, so he uses a blind; a false front for the test. Voiers says that familiarity with the DRT does not affect the test. To satisfy the listeners interest in discovering the rationale of the test, give them a brief explanation of the purpose of the DRT. A summary of voice processers and how the DRT is used to evaluate intelligibility should satisfy the listeners' curiosity and may even develop in them more interest in the program.

The third aim of a subject in a test is to represent himself in a favorable light to the administrator. Subjects are usually curious about their performance. Voiers does not give the test results to his listeners since it could bias later responses. Subjects also try to conform to the expectations of the experimentor, which could lead to biasing through experimentor effects if the administrator is not careful. To solve this problem for the listeners, the administrator should encourage the listeners by recognizing their efforts. He can assure them and show appreciation without giving them the test results. Rosenthal says that a "self-fulfilling prophecy" works on test subjects. If the administrator does not give the listeners any reasons why they would fail as good listeners, and assures them that they are performing well, they should not worry about how they are performing. This, in turn, should minimize any effects due to the listeners doubting their performance.

D3. LISTENER PREPARATION

This section will briefly discuss some aspects of listener selection and use of listeners in the DRT.

Since the DRT is a speech discrimination task, subjects must pass certain hearing tests before they can become listeners in the program. First, the subject must have normal hearing as determined by an audiometer test. Voiers uses a range of 250 to 8000 Hz. Second, the subject must be able to discriminate between the present and absent states of all six voice attributes. Voiers et al found that hearing impairment is not unidimensional and may go beyond simple tone reception. Different aspects of speech discrimination performance are affected depending on

Voiers, W. D. (1969) The Effects of Masking Voices on the Apprehensibility of Six Consonant Attributes, Scientific Report No. 1, AFCRL Contract No. AF19(628)-5883.

^{8.} Voiers, W. D., Sharpley, A. D., and Hehmsoth, C. J. (1973) Research on Diagnostic Evaluation of Speech Intelligibility, Final Report, AFCRL Contract No. F19628-70-C-0182.

the degree and nature of the hearing impairment. This aspect of hearing impairment can be determined by checking the performance of trainee listeners over a control DRT tape. Performance in each voice attribute should level out after a period of practice. Erratic performance on any attribute would indicate a hearing impairment in that individual and he should not be used as a listener. Further tests need to be performed in this area however, since it is unknown how long it takes the average listener to find a consistent level of performance in all attributes. Answers to this question would define the training period for new listeners and would discriminate between good and bad listeners.

After a pool of listeners is established and you are ready to test, trained listeners need a warm-up test before each session of DRTs. Voiers says two speaker lists prove enough warm-up to get the listeners reaccustomed to the DRT. In-house tests have supported this finding. The warm-up lists should not be the same lists which are to be evaluated in the test.

During each DRT session, each listener should be tested to make sure he is performing satisfactorily. Responses from a listener who is under emotional stress, tired, etc. during one session will differ from his normal performance. If this occurs, the listeners' results should not be used in that evaluation. Since eight listeners are used in the DRT, ten listeners should be tested to allow for two sets of results to be discarded for the preceeding reason. A control tape, played once each session, can be used to track the listeners' performance for that day and compare it to their standard performance. Research is necessary in this area to establish criteria on acceptable performance limits for listeners.

D4. CONCLUSIONS AND RECOMMENDATIONS

The DRT is designed so as to minimize experimental effects. The precautions suggested previously in this report, are an aid to insure experimental effects are minimized. The test administrator should be aware of the influence he has on a test, even the DRT. The environment should be kept comfortable and free of changes. After the training period, the listeners should settle into a comfortable understanding and consistency in taking the DRT. Therefore, very little in the way of recommendations on a standard set of instructions can be given to the listeners every time they come to take the test. They will know what their job is. All the administrator need do is remind them to pay consistent attention and how to score the answer sheet. They should become familiarized enough not to require detailed instructions for every session.

There are only two major areas that need refining to better implement the in-house DRT evaluation. The first area involves the discrimination between good

and bad listeners. A good listener is a consistent scorer. An inconsistent listener can not be used in the DRT program. A statistical test to define the limits of consistency has not been developed as of yet. Once criteria have been developed, the bad listeners can be identified and a pool of good listeners can be established for use in the in-house program.

The second area of research involves the tracking of listener performance. Once again, statistical tests have yet to be developed to record the on-going performance of the established listener pool. A statistical test to establish confidence intervals for each individual's performance must be developed to validate each listeners' performance during each DRT.

Once statistical tests to discriminate between consistent and inconsistent listeners and statistical tests to track each individual's performance are developed, the in-house capabilities for the PRT should be sufficient to conduct reliable testing.

References

- Rosenthal, R. (1966) Experimental Effects in Behavioral Research, Appleton-Century-Crofts, New York.
- 2. Interview with W. D. Voiers on 28 Sept 1976 at Dynastat, Austin, Texas
- Voiers, W. D. (1967) Performance Evaluation of Speech Processing Devices, III. Diagnostic Evaluation of Speech Intelligibility, Final Report, Contract No. AF19(628)4987.
- 4. Swets, J. A., and Kristofferson, A.B. (1970) Attention, Annual Review of Psychology, 21:339-366.
- 5. Baker, L. M. (1960) General Experimental Psychology, Oxford University Press, New York.
- 6. Woodworth, R.J., and Scholsberg, H. (1965) Experimental Psychology revised, Holt, Rinehart and Winston, Inc., New York.
- 7. Voiers, W.D. (1969) The Effects of Masking Voices on the Apprehensibility of Six Consonant Attributes, Scientific Report No. 1, AFCRL Contract No. AF19(628)-5883.
- 8. Voiers, W.D., Sharpley, A.D., and Hehmsoth, C.J. (1973) Research on Diagnostic Evaluation of Speech Intelligibility, Final Report, AFCRL Contract No. F19628-70-C-0182.